A

KEY

TO THE

ARITHMETICIAN's GUIDE;

CONTAINING

THE SOLUTIONS AT FULL LENGTH

OF ALL THE

QUESTIONS PROPOSED IN THAT WORK;

Being very neceſſary for all Tutors, who make uſe
of the Guide.

k

By WILLIAM TAYLOR,
TEACHER OF THE MATHEMATICS, AND LAND-SURVEYOR,
BIRMINGHAM.

BIRMINGHAM,
PRINTED AND SOLD BY PEARSON AND ROLLASON;
Sold also by the Author, in Spiceal-Street;
and R. Baldwin, Pater-noster Row, London.
MDCCLXXXVIII.

BRITISH MUSEUM

THE

PREFACE.

THE following pages (which contain the ſolutions at full length to all the queſtions in the *Guide*) are publiſhed at the requeſt of ſeveral eminent Mathematicians and School-maſters, who have ſeen them in manuſcript. The ſolutions follow the order of the queſtions in the *Guide*, are numbered the ſame, and the titles of all the rules run along the top of the pages, ſo that there can be no difficulty in finding the ſolution of any particular queſtion; whereby this work is rendered exceedingly uſeful and neceſſary for all Tutors and others who make uſe of the *Guide*. In all the different parts of this work, where it could conveniently be done, I have varied the operations by way of proof, becauſe it diſcovers the reaſon of the queſtion, and contributes very much towards a thorough underſtanding of it.

My principle object in compoſing this work, has been, not to dictate to, but eaſe the teachers who are employed in this branch of education, from the difficulties they in general labour under with regard to time; too much of which has hitherto been ſpent in examining the ſolutions of queſtions wrought by their pupils.

The favourable reception my former works have met with, gives me room to hope, that this will alſo experience from the public, that candour and regard which is due to ſo laborious an undertaking.

Any obſervations or hints for improvements that may be made, either in the Guide or Key, addreſſed to the Author, or Publiſhers, will be carefully attended to in the future editions of them.

W. TAYLOR.

BIRMINGHAM,
1788.

20 MA 59

ERRATUM.

Page 121, Example 98, *for* 42*l.* 16*s.* *read* 43*l.* 16*s.*

A
KEY
TO THE
ARITHMETICIAN'S GUIDE.

NUMERATION.

Numbers expreſſed in Words anſwered.

EXAMPLE (1) One thouſand ſeven hundred and eighty five.

(2) Three hundred twenty four thouſand, five hundred and ſixteen.

(3) Six hundred and fifteen thouſand, four hundred and twenty-three.

(4) Seven million ſix hundred and fifty-four thouſand, three hundred and twenty-one.

(5) Eighty-ſeven million, ſix hundred and fifty-four thouſand three hundred and twenty-one.

(6) Nine hundred and eighty ſeven million, ſix hundred and fifty-four thouſand, three hundred and twenty-one.

(7) Four hundred and twenty-ſix thouſand, ſeven hundred and eighty-four millions, three hundred and twenty-ſix thouſand, five hundred and thirty-four.

(8) Six hundred and forty-two billions, one hundred and thirty-four thouſand two hundred and ten millions, three hundred and forty-five thouſand, ſix hundred and forty-eight.

(9) Two hundred thirty-four thouſand five hundred and ſixty-three billions, two hundred and fourteen thouſand,

three hundred and ſixty two millions, one hundred and fifty ſix thouſand, ſix hundred and thirty-four.

(10) Fifty-four trillions, three hundred and twenty-ſix thouſand four hundred and twenty-eight billions, nine hundred ſixteen thouſand five hundred and forty-three millions, four hundred and ſixty-five thouſand, three hundred and forty-ſix.

(11) Eight hundred and ſixty-four trillions, two hundred and fifteen thouſand ſix hundred and forty-two billions, four hundred and ſixty-eight millions, four thouſand five hundred and ſixty-two.

(12) Two quadrillions, one hundred forty-ſix thouſand, eight hundred and ſixty-two trillions, eight hundred and ninety-eight thouſand, ſeven hundred and ſixty-four billions eight hundred and forty-two thouſand millions, ſix hundred and ninety-eight thouſand and forty-two.

ADDITON.

ANSWERS.

(1) 36 (2) 675 (3) 5040 (4) 8586
(5) 8460 (6) 7497 (7) 84987 (8) 66726
(9) 63369 (10) 747936 (11) 894861 (12) 1056069

The proving addition by the common method requires more time than the teacher can ſpare for that purpoſe: to remedy which, I have, in theſe examples, made every row of figures to end with nine, conſequently, the total muſt do the ſame if the work be right; and by this method the pupil may be exerciſed with various other examples, until he is found ſufficiently perfect.

QUESTIONS ANSWERED.

(1)	(2)	(3)
34263	63	60
53163	8154	30
8172	6201	12
846	99	6
96444	14517	0 8 pence.

(4) Jan. 31
Feb. 28
March 31
April 30

120 Days.

(5) 1787
60

1847

(6) 1787
116

1903

SUBTRACTION.

ANSWERS.

(1) 74311343522
(2) 64202661111
(3) 46574614221
(4) 48775485155
(5) 32975113221
(6) 64204197581
(7) 63382135411
(8) 44463169266
(9) 35330912534
(10) 46422219863
(11) 55011074745
(12) 22108765433

QUESTIONS ANSWERED.

(1) 1787
1720

67 Years.

(2) 1787
1662

125 Years.

(3) 1746
1700

46 Years.

(4) 68
29

39 Years

(5) 1787
1066

721 Years

(6) 1787
1616

171 Years.

MULTIPLICATION.

ANSWERS.

(1) 4243214646
2

8486429292

(2) 3123546354
3

9370639062

(3) 5462145612
4

21848582448

(4) 6372458163
5
31862290815

(5) 2345678946
6
14074073676

(6) 1234567809
7
8641974663

(7) 2164235472
8
17313883776

(8) 5481728163
9
49335553467

(9) 6213246453
10
62132464530

(10) 4131621045
11
45447831495

(11) 2120462172
12
25445546064

(12) 3124431612
13
40617610956

(13) 3412342629
23
10237027887
6824685258
78483880467

(14) 2434326246
36
14605957476
7302978738
87635744856

(15) 4536423432
45
22682117160
18145693728
204139054440

(16) 5472635481
54
21890541924
27363177405
295522315974

(17) 2142621333
63
6427863999
12855727998
134985143979

(18) 4237125372
72
8474250744
29659877604
305073026784

(19) 421262136
234
1685048544
1263786408
842524272
98575339824

(20) 531621702
324
2126486808
1063243404
1594865106
172245431448

(21) 546217263
426
3277303578
1092434526
2184869052
232688554038

(22) 728163432
368
5825307456
4368980592
2184490296
267964142976

(23) 431162163
248
3449297304
1724648652
862324326
106928216424

(24) 324637254
567
2272460778
1947823524
1623186270
184069323018

(25) 638143245
2345
3190716225
2552572980
1914429735
1276286490
1496445909525

(26) 234621423
3246
1407728538
938485692
469242846
703864269
761581139058

(27) 423620172
4235
2118100860
1270860516
847240344
1694480688
1794031428420

(28) 542034522
3674
2168138088
3794241654
3252207132
1626103566
1991434833828

(29) 621405816
32472
1242811632
4349840712
2485623264
1242811632
1864217448
20178289657152

(30) 534620438
45612
1069240876
534620438
3207722628
2673102190
2138481752
24385107418056

(31) 423546372
23124
1694185488
847092744
423546372
1270639116
847092744
9794086306128

(32) 613854724
42354
2455418896
3069273620
1841564172
1227709448
2455418896
25999202980296

```
(33) 123456789
        324513
     ---------
     370370367
    123456789
   617283945
  493827156
 246913578
370370367
--------------
40063332968757
```

```
(35) 621423234
        234625
     ---------
    3107116170
   1242846468
  3728539404
 2485692936
1864269702
1242846468
---------------
145801426277250
```

```
(37) 235620432
       4523413
     ---------
      706861296
     235620432
    942481728
   706861296
  471240864
 1178102160
 942481728
----------------
1065808525174416
```

```
(34) 987654321
        315423
     ---------
    2962962963
   1975308642
  3950617284
 4938271605
 987654321
2962962963
---------------
311528888892783
```

```
(36) 432324126
        245674
     ---------
    1729296504
   3026268882
  2593944756
 2161620630
1729296504
864648252
---------------
106210797330924
```

```
(38) 315728163
       5423216
     ---------
      1894368978
      315728163
    631456326
   947184489
  631456326
 1262912652
1578640815
----------------
1712262025232208
```

```
(39)         312471423
              41235678
     -----------------
            2499771384
           2187299961
          1874828538
         1562357115
         937414269
        624942846
       312471423
     1249885692
     -----------------
     12884970983029794
```

```
(40)         234567891
              23214678
      ----------------
            1876543128
           1641975237
          1407407346
          938271564
         234567891
        469175782
       703703673
      469135782
      ----------------
      5445418058704098
```

```
(41)         478216243
             123456789
     -----------------
            4303946187
           3825729944
          3347513701
         2869297458
        2391081215
       1912864972
      1434648729
      956432486
     478216243
     -----------------
     59039041808423727
```

```
(42)         123456789
             478216243
     -----------------
             370370367
            493827156
           246913578
          740740734
         123456789
        246913578
       987654312
      864197523
     493827156
     -----------------
     59039041808423727
```

ABBREVIATIONS.

```
(43)         230040702
             402300504
     -----------------
             920162808
          1150203510
        690122106
       460081404
     920162808
     -----------------
     92545490355113808
```

```
(44)         630702009
             203400603
    ------------------
            1892106027
          3784212054
       2522808036
      1892106027
    1261404018
    ------------------
    128285168943911427
```

(45) 720203400
403020270
50414238
14404068
14404068
21606102
28808136
290256568722918000

(46) 403020270
720203400
161208108
120906081
80604054
80604054
282114189
290256568722918000

(47) 987654321
10
9876543210

(48) 19876543
100
1987654300

(49) 1987654
1000
1987654000

(50) 198765
10000
1987650000

BY PARTS.

(51) 123456789
5×3=15
617283945
3
1851851835

(52) 423547281
5×5=25
2117736405
5
10588682025

(53) 324603729
6×6=36
1947622374
6
11685734244

(54) 637146243
8×7=56
5097169944
7
35680189608

(55) 342635481
9×8=72

3083719329
8

24669754632

(56) 241281243
9×9=81

2171531187
9

19543780683

(57) 816021729
12×11=132

9792260748
11

107714868228

(58) 456021723
12×12=144

5472260676
12

65667128112

(59) 420480172
4×7×4=112

1681920688
7

11773444816
4

47093779264

(60) 523602432
12×12×12=1728

6283229184
12

75398750208
12

904785002496

QUESTIONS ANSWERED.

(1) 89460
50

£.4473000 Anſwer

(2) 40
5

£. 200 Anſwer

(3) 39
20

780 Yds

(4)
268
118
2144
268
268
31624 Soldiers.

(5)
235
45
1175
940
10575
50
528750 Letters.

(6)
10000
5
50000 Perſons

(7)
50
50
2500
2000
500 Anſwer

100
20
2000

D I V I S I O N.

ANSWERS

(1)
2)8486429292
4243214646

(2)
3)9370639062
3123546354

(3)
4)21848582448
5462145612

(4)
5)31862290815
6372458163

(5)
6)14074073676
2345678946

(6)
7)8641974663
1234567809

(7)
8)17313883776
2164235472

(8)
9)49335553467
5481728163

(9)
10)62132464530
6213246453

(10)
11)45447831495
4131621045

(11)
12)25445546064
2120462172

(12)

```
        (12)
13)40617610956(3124431612
   39
   .16
    13
    .31
     26
     .57
      52
      .56
       52
       .41
        39
        .20
         13
         .79
          78
          .15
           13
           .26
            26
            ..
```

```
          (13)
23)78483880467(3412342629
   69
   .94
    92
    .28
     23
     .53
      46
      .78
       69
       .98
        92
        .60
         46
         144
         138
         ..66
           46
           207
           207
           ...
```

```
        (14)
36)87635744856(2434326246
   72
   156
   144
   .123
    108
    .155
     144
     .117
      108
      . 94
        72
        224
        216
        ..88
          72
          165
          144
          .216
           216
           ...
```

```
          (15)
45)204139054440(4536423432
   180
   .241
    225
    .163
     135
     .289
      270
      .190
       180
       .105
         90
        154
        135
        .194
         180
         .144
          135
          ..90
            90
            ..
```

(16)
54)295522315974(5472635481
270
.255
216
.392
378
.142
108
.343
324
.191
162
.295
270
.259
216
.437
432
..54
54
..

(17)
63)134985143979(2142621333
126
..89
63
268
252
.165
126
.391
378
.134
126
..83
63
209
189
.207
189
189
189
...

(18)
72)305073026784(4237125372
288
.170
144
.267
216
.513
504
..90
72
182
144
.386
360
.267
216
.518
504
.144
144
...

(19)
234)98575339824(421262136
936
.497
468
.295
234
.613
468
1453
1404
..499
468
.318
234
.842
702
1404
1404
....

(20)

324)172245431448(531621702
1620
. 1024
972
. 525
324
2014
1944
.. 703
648
. 551
324
2274
2268
... 648
648

(21)

426)232688554038(546217263
2130
. 1968
1704
. 2648
2556
.. 925
852
. 735
426
3094
2982
.. 1120
852
. 2683
2556
. 1278
1278

(22)

368)267964142976(728163432
2576
. 1036
736
. 3004
2944
.. 601
368
2334
2208
. 1262
1104
. 1589
1472
. 1177
1104
.. 736
736

(23)

248)106928216424(431162163
992
. 772
744
. 288
248
. 402
248
1541
1488
.. 536
496
. 404
248
1562
1488
. 744
744

(24)

567)184069323018(324637254
1701
·1396
1134
·2629
2268
·3613
3402
·2112
1701
·4113
3969
·1440
1134
·3061
2835
·2268
2268

(25)

2345)149644590952 5(638143245
14070
··8944
7035
19095
18760
··3359
2345
10140
9380
·7609
7035
·5745
4690
10552
9380
11725
11725

(26)

3246)761581139058(234621423
6492
11238
9738
15001
12984
·20171
19476
··6953
6492
·4619
3246
13730
12984
··7465
6492
·9738
9738

(27)

4235)179403142842 0(423620172
16940
·10003
8470
15331
12705
·26264
25410
··8542
8470
··7284
4235
30492
29645
··8470
8470

3674)1991434833828(542034522
18370
..15443
14696
..7474
7348
.12683
11022
.16613
14696
.19178
18370
..8082
7348
.7348
7348

(29)

32472)20178289657152(621405816
194832
..69508
64944
.45649
32472
131776
129888
..188857
162360
.264971
259776
..51955
32472
194832
194832

(30)

45612)24385107418056(534620438
228060
.157910
136836
.210747
182448
.282994
273672
..93221
91224
.199780
182448
.173325
136836
.364896
364896

(31)

23124)9794086306128(423546372
92496
.54448
46248
.82006
69372
.126343
115620
.107230
92496
.147346
138744
..86021
69372
166492
161868
..46248
46248

(32)

```
42354)25999202980296(613854724
      254124
      ..58680
        42354
        163262
        127062
        .362009
         338832
         .231778
          211770
          .200080
           169416
           .306642
            296478
            .101649
              84708
             .169416
              169416
```

(33)

```
324513)40063332968757(123456789
       324513
       .761203
        649026
        1121772
         973539
         1482339
         1298052
         .1842876
          1622565
          .2203118
           1947078
           .2560407
            2271591
            .2888165
             2596104
             .2920617
              2920617
```

(34)

```
315423)311528888892783(987654321
       2838807
       .2764818
        2523384
        .2414348
         2207961
         .2063878
          1892538
          .1713409
           1577115
           .1362942
            1261692
            .1012507
              946269
              .662388
               630846
               .315423
                315423
```

(35)

```
234625)145801426277250(621423234
       1407750
       ..502642
         469250
         .333926
          234625
          .993012
           938500
           .545127
            469250
            .758777
             703875
             .549022
              469250
              .797725
               703875
               .938500
                938500
```

(36)

```
             (36)
245674)106210797330924(432324126
       982696
       ------
       .794119
        737022
        ------
        .570977
         491348
         ------
         .796293
          737022
          ------
          .592713
           491348
           -------
           1013650
            982696
            ------
            .309549
             245674
             ------
             .638752
              491348
              -------
              1474044
              1474044
              -------
```

```
                (37)
4523413)1065808525174416(235620432
        9046826
        --------
        16112592
        13570239
        --------
        .25423535
         22617065
         --------
         .28064701
          27140478
          --------
          ..9242237
             9046826
            --------
            .19541144
             18093652
             --------
             .14474921
              13570239
              --------
              ..9046826
                9046826
                -------
```

```
              (38)
5423216)17122620252322208(315728163
        16269648
        --------
        ..8529722
          5423216
          --------
          31065065
          27116080
          --------
          .39489852
           37962512
           --------
           .15273403
            10846432
            --------
            .44269712
             43385728
             --------
             ..8839842
               5423216
               --------
               34166260
               32539296
               --------
               .16269648
                16269648
                --------
```

```
                  (39)
41235678)12884970983029794(312471423
         123707034
         ---------
         ..51426758
           41235678
           ---------
           101910803
            82471356
           ---------
           194394470
           164942712
           ---------
           .294517582
            288649746
            ---------
            ..58678369
              41235678
              ---------
              174426917
              164942712
              ---------
              ..94842059
                82471356
              ---------
              123707034
              123707034
              ---------
```

(40)

```
23214678)54454180587040098(234567891
         46429356
         .80248245
          69644034
          106042118
           92858712
           131834067
           116073390
           .157606770
            139288068
            .183187024
             162502746
             .206842780
              185717424
              .211253569
               208932102
               ..23214678
                 23214678
```

(41)

```
123456789)59039041808423727(478216243
          493827156
          .965632620
           864197523
           1014350978
            987654312
            .266966664
             246913578
             .200530862
              123456789
              .770740733
               740740734
               .299999997
                246913578
                .530864192
                 493827156
                 .370370367
                  370370367
```

(42)

```
478216243)59039041808423727(123456789
          478216243
          1121741750
           956432486
           1653092648
           1434648729
           .2184439194
            1912864972
            .2715742222
             2391081215
             .3246610073
              2869297458
              .3773126157
               3347513701
               .4256124562
                3825729944
                .4303946187
                 4303946187
```

ABBREVIATIONS.

ABBREVIATIONS.

(43)

```
402300504)92545490355113808(230040702
          804601008
          ---------
          1208538955
          1206901512
          ----------
          ...1637443511
             1609202016
             ----------
             ..2824149538
               2816103528
               ----------
               ...804601008
                  804601008
                  ---------
```

(44)

```
203400603)128285168943911427(630702009
          1220403618
          ----------
          ..624480714
            610201809
            ---------
            .1427890539
             1423804221
             ----------
             ...408631811
                406801206
                ---------
                ..1830605427
                  1830605427
                  ----------
```

(45)
40302027|0)29025656872291800|0(720203400
282114189
..81423797
80604054
..81974322
80604054
.137026891
120906081
.161208108
161208108

(46)
7202034|00)2902565687229180|00(403020270
28808136
..21752087
21606102
..14598522
14404068
..19445491
14404068
.50414238
50414238

(47)
1|0)987654321|0
987654321

(48)
1|00)19876543|00
19876543

(49)
1|000)1987654|000
1987654

(50)
1|0000)198765|0000
198765

BY PARTS.

(51)
15 { 3)1851851835
5) 617283945
123456789

(52)
25 { 5)10588682025
5) 2117736405
423547281

(53)
36 { 6)11685734244
6) 1947622374
324603729

(54)
56 { 7)35680189608
8) 5097169944
637146243

(55)
72 { 8)24669754632
9) 3083719329
342635481

(56)
81 { 9)19543780683
9) 2171531187
241281243

(57)
132 { 11)107714868228
12) 9792260748
816021729

(58)
144 { 12)65667128112
12) 5472260676
456021723

(59)
112 { 4)47093779264
7)11773444816
4) 1681920688
420480172

(60)
1728 { 12)904785002496
12) 75398750208
12) 6283229184
523602432

QUESTIONS ANSWERED.

(1) £. £.
89460)4473000(50 Anſwer
4473000

(2) £.
4,0)20,0
Anſwer £. 5 each man

(3)

(3)

2,0)78,0

Anſw. 39 yards deep

(5) 5,0)52875,0

45 { 5)10575
   { 9) 2115

Anſw. 235 Pages.

(4)

268)31624(118 Men anſwer
268
482
268
2144
2144

(6)

5)50000

Anſw. 10000 houſes

(7)

100 50
20 50
2000 2500
2000

Anſwer 500

COMPOUND ADDITION.

ANSWERS.

	£.	s.	d.
(1)	324	12	$6\frac{3}{4}$
(2)	354	0	$0\frac{1}{2}$
(3)	7666	4	3
(4)	6461	0	$1\frac{1}{2}$
(5)	6477	7	$7\frac{1}{4}$
(6)	7216	9	$3\frac{1}{2}$
(7)	6807	7	$10\frac{1}{2}$
(8)	6024	8	$7\frac{1}{2}$
(9)	5997	7	$10\frac{1}{2}$
(10)	6015	8	$9\frac{3}{4}$
(11)	6824	2	$4\frac{1}{2}$
(12)	8922	6	1

TROY WEIGHT.

	lb.	*oz.*	*dwt.*	*gr.*
(13)	486	4	1	0
(14)	413	4	14	21

APOTHECARIES WEIGHT.

	lb.	*oz.*	*dr.*	*ſc.*	*gr.*
(15)	68	3	1	2	17
(16)	76	2	1	0	15

AVOIR-

AVOIRDUPOISE WEIGHT.

	T.	*C.*	*qr.*	*lb.*	*oz.*	*dr.*		*T.*	*C.*	*qr.*	*lb.*	*oz.*	*dr.*
(17)	69	6	0	12	2	3	(18)	77	9	0	9	15	5

CLOTH MEASURE.

	Yds.	*qr.*	*na.*		*E. Ells*	*qr.*	*na.*		*F. Ells*	*qr.*	*na.*
(19)	623	1	0	(20)	622	1	3	(21)	817	1	2

LONG MEASURE.

	Leag.	*mi.*	*fur.*	*po.*		*Yds.*	*ft.*	*in.*	*b.c.*
(22)	584	0	4	17	(23)	691	2	9	0

LAND MEASURE.

	A.	*R.*	*P.*		*A.*	*R.*	*P.*		*A.*	*R.*	*P.*
(24)	583	3	12	(25)	620	0	25	(26)	692	2	35

WINE MEASURE.

	T.	*hhd.*	*gal.*	*qt.*	*pi.*		*T.*	*hhd.*	*gal.*	*qt.*	*pi.*
(27)	96	3	46	3	1	(28)	95	3	53	1	0

ALE and BEER MEASURE.

	A. hhd.	*gal.*	*qt.*	*pi.*		*B. hd.*	*gal.*	*qt.*	*pi.*
(29)	582	29	1	1	(30)	613	26	1	1

DRY MEASURE.

	Laſts	*qr.*	*bu.*	*pec.*	*gal.*		*Laſts*	*qr.*	*bu.*	*pec.*	*gal.*
(31)	86	7	2	1	0	(32)	95	0	0	2	1

TIME.

	Years	*mo.*	*w.*	*days*		*Days*	*ho.*	*mi.*	*ſec.*
(33)	794	2	0	6	(34)	875	21	46	29

MOTION.

	S.	o.	′	″	‴		*S.*	o.	′	″	‴
(35)	107	9	56	56	18	(36)	95	1	11	52	22

SQUARE MEASURE.

	Yds.	*ft.*	*inch*		*Yds.*	*ft.*	*inch*
(37)	1091	6	114	(38)	1015	6	104

SOLID MEASURE.

	Yds.	*ft.*	*inch*		*Yds.*	*ft.*	*inch*
(39)	855	10	671	(40)	970	18	749

QUESTIONS

QUESTIONS ANSWERED.

(1)

	£.	s.	d.
Recd. of A	27	1	4
B	12	6	8½
C	31	12	8
D	42	14	8¼
E	82	4	2
F	41	16	3½
Anſwer £.	237	15	10¼ ſum received

(2)

	£.	s.	d.
Wheat	23	12	6
Rye	16	4	2
Oats	20	0	6
Barley	38	14	6½
Car.	1	6	0
Commiſ.	3	10	6
£.	103	8	2½ anſ.

(3)

	£.	s.	d.
Paid in part	30	10	6
Remains unpaid	42	2	4
Anſwer	72	12	10

(4)

	£.	s.	d.
Officers	394	12	6
receive	240	0	0
Anſwer	634	12	6

(5)

	£.	s.	d.
Firſt coſt	58	0	0
Packing	0	10	6
Carriage	1	7	0
Spent	0	6	8
Anſwer	60	4	2

(6)

	£.	s.	d.
Rent	30	0	0
Window lights	0	18	10½
Poor's rates	10	0	0
Lamps, &c.	2	2	0
Anſwer	43	0	10½

COMPOUND SUBTRACTION.

ANSWERS.

	£.	s.	d.
(1)	23	6	2¼
(2)	17	6	3½
(3)	15	7	5½
(4)	21	11	9¼
(5)	41	9	3¾
(6)	18	1	11½
(7)	17	17	10¼
(8)	26	18	6½

TROY WEIGHT.

lb. oz. dwt. grs.
(9) 72 2 9 9

lb. oz. dwt. grs.
(10) 46 3 7 4

lb. oz. dwt. grs.
(11) 74 9 17 4

lb. oz. dwt grs.
(12) 73 1 12 9

APOTHECARIES WEIGHT.

lb. oz. dr. ſc. grs.
(13) 55 1 3 1 6

lb. oz. dr. ſc. grs.
(14) 19 5 4 1 3

lb. oz. dr. ſc. grs.
(15) 42 1 4 1 2

lb. oz. dr. ſc. grs.
(16) 15 5 3 1 12

AVOIRDUPOISE WEIGHT.

T. C. qr. lb. oz. dr.
(17) 4 6 1 3 2 4

T. C. qr. lb. oz. dr.
(18) 3 17 2 5 1 4

T. C. qr. lb. oz. dr.
(19) 8 4 1 12 13 14

T. C. qr. lb. oz. dr.
(20) 3 5 1 15 5 6

CLOTH MEASURE.

Yds. qr. na.
(21) 33 2 1

E.E. qr. na.
(22) 33 1 2

F.E. qr. na.
(23) 29 0 1

Yds. qr. na.
(24) 25 2 1

E. E. qr. na.
(25) 15 0 2

F. E. qr. na.
(26) 3 0 2

LONG MEASURE.

Leag. mi. fur. po.
(27) 44 1 2 15

Yds. ft. in. b. c.
(28) 33 1 2 1

Leag. mi. fur. po.
(29) 19 1 1 14

Yds. ft. in b.c.
(30) 47 0 1 2

LAND MEASURE.

A. R. P.
(31) 66 2 17

A. R. P.
(32) 27 2 11

A. R. P.
(33) 29 2 22

A. R. P.
(34) 20 0 28

A. R. P.
(35) 18 2 11

A. R. P.
(36) 76 0 1

WINE MEASURE.

T. hhd. gal. qt. pi.
(37) 3 2 29 2 1

T. hhd. gal. qt. pi.
(38) 4 2 13 1 1

T. hhd. gal. qt. pi.
(39) 2 2 12 1 1

T. hhd. gal. qt. pi.
(40) 3 0 0 1 0

ALE and BEER MEASURE.

	A. bbl.	*gal.*	*qt.*	*pi.*
(41)	11	24	1	1

	A. bbl.	*gal.*	*qt.*	*pi.*
(42)	28	28	3	1

	A. bbl.	*gal.*	*qt.*	*pi.*
(43)	2	1	0	1

	A. bbd.	*gal.*	*qt.*	*pi.*
(44)	49	31	1	1

DRY MEASURE.

	Laſts	*qr.*	*bu.*	*pec.*	*gal.*
(45)	4	2	3	1	1

	Laſts	*qr.*	*bu*	*pec.*	*gal.*
(46)	5	7	3	2	1

	Laſts	*qr.*	*bu.*	*pec.*	*gal.*
47)	2	5	2	3	1

	Laſts	*qr.*	*bu.*	*pec.*	*gal.*
(48)	3	2	1	2	1

TIME.

	Years	*mo.*	*w.*	*days*
(49)	62	7	2	3

	Days	*ho.*	*mi.*	*ſec.*
(50)	43	8	33	16

	Years	*mo.*	*w.*	*days*
(51)	26	3	2	4

	Days	*ho.*	*mi.*	*ſec.*
(52)	44	13	19	25

MOTION.

	S.	°	′	″	‴
(53)	5	4	15	30	5

	S.	°	′	″	‴
(54)	4	15	27	9	36

	S.	°	′	″	‴
(55)	3	13	27	34	35

	S.	°	′	″	‴
(56)	4	16	33	37	8

SQUARE MEASURE.

	Yds.	*ft.*	*inch*
(57)	30	2	115

	Yds.	*ft.*	*inch*
(58)	67	4	73

	Yds.	*ft.*	*inch*
(59)	24	5	22

	Yds.	*ft.*	*inch*
(60)	33	5	36

SOLID MEASURE.

	Yds.	*ft.*	*inch*
(61)	2	13	233

	Yds.	*ft.*	*inch*
(62)	2	11	472

	Yds.	*ft.*	*inch*
(63)	4	6	658

	Yds.	*ft.*	*inch*
(64)	5	2	12

QUESTIONS ANSWERED.

(1)

	£.	s.	d.
From	86	0	$6\frac{3}{4}$
Take	31	18	11
Differ.	54	1	$7\frac{3}{4}$

(2)

	£.	s.	d.
Lent	200	0	0
Recd. by goods	84	6	4
Remains due	115	13	8

(3)

From	18308	1508
Take	2118	+610
Diff.	16190	2118

(4)

	£.	s.	d.
Houſe & furniture	1100	8	$4\frac{1}{2}$
Houſe	742	10	6
Furniture coſt	357	17	$10\frac{1}{2}$

(5)

	Years	*m.*	*w.*	*d.*	*h.*	*m.*	
From	21	0	0	0	0	0	
Take	14	12	11	10	9	8	
To ſerve	5	10	3	3	14	52	Anſw.

(6)

Debtor

		£.	s.	d.
To	A.	86	10	6
	B.	36	0	0
	C.	20	12	$4\frac{1}{2}$
	D.	56	18	0
	E.	10	10	3
	F.	86	8	6
Debtor		296	19	$7\frac{1}{2}$
Creditor		148	10	4
Anſwer £.		148	9	$3\frac{1}{2}$

Creditor

	£.	s.	d.
By caſh	10	0	0
Commodities	21	12	0
Houſh. furniture	42	0	6
Book debts	62	13	6
Plate	12	4	4
£.	148	10	4

COMPOUND MULTIPLICATION.

ANSWERS.

(1)
s. d.
16 4
3
Anſ. £. 2 9 0

(2)
s. d.
7 3
4
£. 1 9 0

(3)
s. d.
1 2
5
£. 0 5 10

(4)
s. d.
0 7½
6
£. 0 3 9

(5)
s. d.
9 6
7
£. 3 6 6

(6)
s. d.
2 4
8
£. 0 18 8

(7)
s. d.
1 9
9
£. 0 15 9

(8)
s. d.
2 2½
10
£. 1 2 1

(9)
£. s. d.
2 1 4
11
£. 22 14 8

(10)
£. s. d.
1 4 3
12
£. 14 11 0

(11)
s. d.
17 6
2×7=14
1 15 0
7
£. 12 5 0

(12)
s. d.
7 10½
3×5=15
1 3 7½
5
£. 5 18 1½

(13)
£. s.
1 7
4×4=16
5 8
4
£. 21 12

	£.	s.	d.	
(14)		17	6	
			3	×6=18
	2	12	6	
			6	
£.	15	15	0	

	£.	s.	d.	
(15)	1	18	8	
			4	×5=20
	7	14	8	
			5	
£.	38	13	4	

	£.	s.	d.	
(16)		5	7½	
			3	×7=21
		16	10½	
			7	
£.	5	18	1½	

	£.	s.	d.	
(17)	5	11	4	
			2	×11=22
	11	2	8	
			11	
£.	122	9	4	

	£.	s.	d.	
(18)	4	7	2	
			4	×6=24
	17	8	8	
			6	
£.	104	12	0	

	£.	s.	d.	
(19)		4	6	
			5	×5=25
	1	2	6	
			5	
£.	5	12	6	

	£.	s.	d.	
(20)		5	11½	
			3	×9=27
		17	10½	
			9	
£.	8	0	10½	

	£.	s.	d.	
(21)		2	8	
			4	×7=28
		10	8	
			7	
£.	3	14	8	

(22) £. s.
1 12
6×5=30
9 12
5
£. 48 0

(23) s. d.
1 9
4×8=32
7 0
8
£. 2 16 0

(24) £. s.
1 2
3×11=33
3 6
11
£. 36 6

(25) £. s. d.
1 2 6
5×7=35
5 12 6
7
£. 39 7 6

(26) s. d.
6 2½
6×6=36
1 17 3
6
£. 11 3 6

(27) £. s. d.
1 12 6
5×8=40
8 2 6
8
£. 65 0 0

(28) s. d.
6 4½
6×7=42
1 18 3
7
£. 13 7 9

(29) s. d.
19 10
4×11=44
3 19 4
11
£ 43 12 8

		s.	d.	
(30)		19	4	
				5×9=45
	4	16	8	
			9	
	£. 43	10	0	

		s.	d.	
(31)		3	7	
				6×8=48
	1	1	6	
			8	
	£. 8	12	0	

		s.	d.	
(32)		2	5½	
				5×10=50
		12	3½	
			10	
	£. 6	2	11	

	£.	s.	d.	
(33)	1	16	6	
				6×9=54
	10	19	0	
			9	
	£. 98	11	0	

	£.	s.	
(34)	1	10	
			5×11=55
	7	10	
		11	
	£. 82	10	

	£.	s.	d.	
(35)	1	2	6	
				7×8=56
	7	17	6	
			8	
	£. 63	0	0	

		s.	d.	
(36)		6	9	
				6×10=60
	2	0	6	
			10	
	£. 20	5	0	

		s.	d.	
(37)		4	3	
				7×9=63
	1	9	9	
			9	
	£. 13	7	9	

(38)
s. d.
4 8
8×8=64

1 17 4
8

£. 14 18 8

(39)
s. d.
1 6¼
6×11=66

9 3
11

£. 5 1 9

(40)
s. d.
1 4
7×10=70

9 4
10

£. 4 13 4

(41)
s. d.
1 8
8×9=72

13 4
9

£. 6 0 0

(42)
s. d.
3 2¼
7×11=77

1 2 3¾
11

£. 12 5 5¼

(43)
s. d.
3 6
8×10=80

1 8 0
10

£. 14 0 0

(44)
d.
7½
9×9=81

5 7½
9

£. 2 10 7½

(45)
£. s. d.
21 4 6
7×12=84

148 11 6
12

£. 1782 18 0

(46)

(46) s. d.
4 6
8×11=88
1 16 0
11
£. 19 16 0

(47) s.
6
10×9=90
3 0
9
£. 27 0

(48) £. s.
2 10
8×12=96
20 0
12
£. 240 0

(49) £. s.
8 10
9×11=99
76 10
11
£. 841 10

(50) s.
17
10×10=100
8 10
10
£. 85 0

(51) s. d.
5 6
9×12=108
2 9 6
12
£. 29 14 0

(52) s. d.
1 10
10×11=110
18 4
11
£. 10 1 8

(53) s. d.
2 8
10×12=120
1 6 8
12
£. 16 0 0

(54)

(54)
s. d.
1 2
11×11=121
12 10
11
£. 7 1 2

(55)
s. d.
2 4
11×12=132
1 5 8
12
£. 15 8 0

(56)
s. d.
2 2
12×12=144
1 6 0
12
£. 15 12 0

(57)
d.
4½
8×7×2=112
2 10
7
19 10
2
£. 1 19 8

(58)
d.
3½
8×7×4=224
2 4
7
16 4
4
£. 3 5 4

(59)
d.
5½
8×7×6=336
3 8
7
1 5 8
6
£. 7 14 0

(60)
s. d.
5 4
10×9×4=360
2 13 4
9
24 0 0
4
£. 96 0 0

(61)
s. d.
1 4
8×7×10=560
10 8
7
3 14 8
10
£. 37 6 8

(62) £. s. d.
1 2 2
12×12×12=1728
13 6 0
12
159 12 0
12
£.1915 4 0

(63) s. d.
5 6
4×4+1=17
1 2 0
4
4 8 0
+5 6
£.4 13 6

(64) s. d.
3 6
3×7+2=23
10 6
7
3 13 6=21
+7 0=2
£.4 0 6

(65) s. d.
14 6
4×7+1=29
2 18 0
7
20 6 0
+14 6
£.21 0 6

(66) s. d.
3 6
5×7−1=34
17 6
7
6 2 6
−3 6
£.5 19 0

(67) d.
9
6×6+1=37
4 6
6
1 7 0
+9
£.1 7 9

(68) s. d.
2 2
6×7+1=43
13 0
7
4 11 0
+2 2
£.4 13 2

(69) s. d.
12 $6\frac{1}{2}$
5×8−1=39
3 2 $8\frac{1}{2}$
8
25 1 8
−12 $6\frac{1}{2}$
£.24 9 $1\frac{1}{2}$

s. d.
(70) 1 6½
5×9+2=47
7 8½
9
3 9 4¼
+3 1
£. 3 12 5½

d.
(71) 9
6×9−1=53
4 6
9
2 0 6
−9
£ 1 19 9

s. d.
(72) 6 6
6×10−1=59
1 19 0
10
19 10 0
−6 6
£.19 3 6

s. d.
(73) 1 8
7×10+1=71
11 8
10
5 16 8
+1 8
£.5 18 4

s. d.
(74) 4 8
9×9+2=83
2 2 0
9
18 18 0
+9 4
£. 19 7 4

s. d.
(75) 6 8
8+11+1=89,
2 13 4
11
29 6 8
+6 8
£. 29 13 4

s. d.
(76) 6 8
8×12+1=97
2 13 4
12
32 0 0
+6 8
£. 32 6 8

s. d.
(77) 8 2
9×12−2=106
3 13 6
12
44 2 0
−16 4
£. 43 5 8

s. d.
(78) 10 2
9×12+1=109
4 11 6
12
54 18 0
+10 2
£.55 8 2

s. d.
(79) 5 6½
11×11+2=123
3 0 11½
11
33 10 6½
+11 1
£.34 1 7½

£. s. d.
(80) 1 3 2
12×12+1=145
13 18 0
12
166 16 0
+1 3 2
£.167 19 2

d.
(81) ¼)9
5×5+¼=25¼
3 9
5
18 9
+2¼
£.0 18 11¼

s. d.
(82) 2 4½
5×6+½=30½
11 10½
6
3 11 3
+1 2¼
£.3 12 5¼

£. s. d.
(83) ½)1 10 6
5×7+¾=35¾
7 12 6
7
53 7 6
+15 3
+7 7½
£.54 10 4½

£. s. d.

(84) $\frac{1}{2}$)32 2 6

$5\times8+\frac{1}{2}=40\frac{1}{2}$

160 12 6

8

1285 0 0

+16 1 3

£. 1301 1 3

£. s.

(85) $\frac{1}{4}$)2 12

$8\times8+\frac{1}{4}=64\frac{1}{4}$

20 16

8

166 8

+13

£. 167 1

£. s.

(86) $\frac{1}{2}$)1 4

$9\times9+\frac{1}{2}=81\frac{1}{2}$

10 16

9

97 4

+12

£. 97 16

s. d.

(87) $\frac{1}{4}$)2 4

$9\times12+\frac{1}{4}=108\frac{1}{4}$

1 1 0

12

12 12 0

+7

£. 12 12 7

s. d.

(88) $\frac{1}{2}$)6 8$\frac{1}{2}$

$10\times12+\frac{1}{2}=120\frac{1}{2}$

3 7 1

12

40 5 0

+3 4$\frac{1}{4}$

£. 40 8 4$\frac{1}{4}$

s. d.

(89) $\frac{1}{4}$)1 4

$11\times12+\frac{1}{4}=132\frac{1}{4}$

14 8

12

8 16 0

+4

£. 8 16 4

s. d.

(90) $\frac{1}{2}$)9 2

$12\times12+\frac{1}{2}=144\frac{1}{2}$

5 10 0

12

66 0 0

+4 7

£. 66 4 7

	£.	s.	d.
(91) ¼)	1	5	6
	12	15	0
			11
	140	5	0
	+8	18	6
		+6	4½
	£.149	9	10½

10×11+7¼=117¼

	s.	d.
(92) ½)	12	9½
7	13	6
		12
92	2	0
	+12	9½
	+6	4¾
£.93	1	2¼

12×12+1½=145½

	£.	s.	d.
(93) ½)	60	2	4½
	721	8	6
			12
	8657	2	0
			10
	86571	0	0
	+60	2	4½
	+30	1	2¼
	£.86661	3	6¾

12×12×10+1½=1441½

	£.	s.	d.
(94)	1	5	3
	15	3	0
			12
	181	16	0
			12
	2181	12	0
½)	+1	5	3
½)		+12	7½
		+6	3¾
	£.2183	16	2¼

12×12×12+1¾=1729¾

	£.	s.	d.
(95)	1	4	10¼
	12	8	6½
			9
	111	16	10½
			4
	447	7	6
	+6	4	3¼
	£.453	11	9¼

10×9×4+5=365

	£.	s.	d.
(96)	362	10	6½
	1087	11	7½
			4
	4350	6	6
½)	+362	10	6½
	+181	5	3¼
	£.4894	2	3¾

3×4+1½=13½

	£.	s.	d.
(97)	4	4	3¼
			10×10×10×9+652=9652
	42	2	8½
			10
	421	7	1
			10
	4213	10	10
			9
	37921	17	6
	+2528	2	6
	+210	13	6½
	+8	8	6½
	£.40669	2	1

	£.	s.	d.	
(98)	3	2	6¼	
			10×9×4+5=365	
	31	5	2½	
			9	
	281	6	10½	
			4	
	1125	7	6	
	+15	12	7¼	
Take	1141	0	1¼	expended yearly
From	2264	0	0	yearly income
	£.1122	19	10¾	Anſwer

	C.	q.	lb.	
(99)	8	1	21	
			6×6+1=37	
	50	2	14	
			6	
	303	3	0	
	+8	1	21	
	C.312	0	21	Anſwer

	C.	q.	lb.	
(100)	9	1	12	
			9×12+1=109	
	84	0	24	
			12	
	1010	2	8	
	+9	1	12	
	C.1019	3	20	Anſwer

COMPOUND DIVISION.

ANSWERS.

(1) £. s. d.
3)2 9 0
£. 0 16 4 Anſwer

(2) £. s. d.
4)1 9 0
£. 0 7 3 Anſ.

(3) £. s. d.
5)0 5 10
£. 0 1 2

(4) £. s. d.
6)0 3 9
£. 0 0 7½

(5) £. s. d.
7)3 6 6
£. 0 9 6

(6) £. s. d.
8)0 18 8
£. 0 2 4

(7) £. s. d.
9)0 15 9
£. 0 1 9

(8) £. s. d.
10)1 2 1
£. 0 2 2½

(9) £. s. d.
11)22 14 8
£. 2 1 4

(10)
£. s. d.
12)14 11 0
£. 1 4 3

(11)
£. s. d.
14 { 7)12 5 0
14 { 2) 1 15 0
£. 0 17 6

(12)
£. s. d.
15 { 5)5 18 1½
15 { 3)1 3 7½
£. 0 7 10½

(13) £. s. d.
16 { 4)21 12 0
16 { 4) 5 8 0
£. 1 7 0

(14) £. s. d.
18 { 6)15 15 0
18 { 3) 2 12 6
£. 0 17 6

(15) £. s. d.
20 { 5)38 13 4
4) 7 14 8
£.1 18 8

(16) £. s. d.
21 { 7)5 18 1½
3)0 16 10½
£.0 5 7½

(17) £. s. d.
22 { 11)122 9 4
2) 11 2 8
£.5 11 4

(18) £. s. d.
24 { 6)104 12 0
4) 17 8 8
£.4 7 2

(19) £. s. d.
25 { 5) 5 12 6
5) 1 2 6
£.0 4 6

(20) £. s. d.
27 { 9) 8 0 10½
3) 0 17 10½
£.0 5 11½

(21) £ s. d.
28 { 7)3 14 8
4)0 10 8
£.0 2 8

(22) £. s. d.
30 { 5)48 0 0
6) 9 12 0
£.1 12 0

(23) £. s. d.
32 { 8)2 16 0
4)0 7 0
£.0 1 9

(24) £. s. d.
33 { 11)36 6 0
3) 3 6 0
£.1 2 0

(25) £. s. d.
35 { 7)39 7 6
5) 5 12 6
£.1 2 6

(26) £. s. d.
36 { 6)11 3 6
6) 1 17 3
£.0 6 2½

(27) £. s. d.
40 { 8)65 0 0
5) 8 2 6
£.1 12 6

(28) £. s. d.
42 { 7)13 7 9
6) 1 18 3
£.0 6 4½

(29) £. s. d.
44 { 11)43 12 8
4) 3 19 4
£.0 19 10

(30) £. s. d.
45 { 9)43 10 0
5) 4 16 8
£0 19 4

(31) £. s. d.
48 { 8)8 12 0
6)1 1 6
£.0 3 7

(32) £. s. d.
50 { 10)6 2 11
5)0 12 3½
£.0 2 5½

(33) £. s. d.
54 { 9)98 11 0
6)10 19 0
£.1 16 6

(34) £. s. d.
55 { 11)82 10 0
5) 7 10 0
£.1 10 0

(35) £. s. d.
56 { 8)63 0 0
7) 7 17 6
£.1 2 6

(36) £. s. d.
60 { 10)20 5 0
6) 2 0 6
£.0 6 9

(37) £. s. d.
63 { 9)13 7 9
7) 1 9 9
£.0 4 3

(38) £. s. d.
64 { 8)14 18 8
8) 1 17 4
£.0 4 8

(39) £. s. d.
66 { 11)5 1 9
6)0 9 3
£.0 1 $6\frac{1}{2}$

(40) £. s. d.
70 { 10)4 13 4
7)0 9 4
£.0 1 4

(41) £. s. d.
72 { 9)6 0 0
8)0 13 4
£.0 1 8

(42) £. s. d.
77 { 11)12 5 $5\frac{3}{4}$
7) 1 2 $3\frac{3}{4}$
£.0 3 $2\frac{1}{4}$

(43) £. s. d.
80 { 10)14 0 0
8) 1 8 0
£.0 3 6

(44) £. s. d.
81 { 9)2 10 $7\frac{1}{2}$
9)0 5 $7\frac{1}{2}$
£.0 0 $7\frac{1}{2}$

(45) £. s. d.
84 { 12)1782 18 0
7) 148 11 6
£.21 4 6

(46) £. s. d.
88 { 11)19 16 0
8) 1 16 0
£.0 4 6

(47) £. s. d.
90 { 9)27 0 0
10) 3 0 0
£.0 6 0

(48) £. s. d.
96 { 12)240 0 0
8) 20 0 0
£.2 10 0

(49) £. s. d.
99 { 11)841 10 0
9) 76 10 0
£. 8 10 0

(50) £. s. d.
100 { 10)85 0 0
10) 8 10 0
£.0 17 0

(51)

(51) £. s. d.
108 { 12)29 14 0
9) 2 9 6
£.0 5 6

(52) £. s. d.
110 { 11)10 1 8
10) 0 18 4
£.0 1 10

(53) £. s. d.
120 { 12)16 0 0
10) 1 6 8
£.0 2 8

(54) £. s. d.
121 { 11)7 1 2
11)0 12 10
£.0 1 2

(55) £. s. d.
132 { 12)15 8 0
11) 1 5 8
£.0 2 4

(56) £. s. d.
144 { 12)15 12 0
12) 1 6 0
£.0 2 2

(57) £. s. d.
112 { 2)1 19 8
7)0 19 10
8)0 2 10
£.0 0 $4\frac{1}{4}$

(58) £. s. d.
224 { 4)3 5 4
7)0 16 4
8)0 2 4
£.0 0 $3\frac{1}{2}$

(59) £. s. d.
336 { 6)7 14 0
7)1 5 8
8)0 3 8
£.0 0 $5\frac{1}{2}$

(60) £. s. d.
360 { 4)96 0 0
9)24 0 0
10)2 13 4
£.0 5 4

(61) £. s. d.

560 { 10)37 6 8
7) 3 14 8
8) 0 10 8
£.0 1 4

(62) £. s. d.

1728 { 12)1915 4 0
12) 159 12 0
12) 13 6 0
£.1 2 2

(63) £. s. d.
4 13 6
20
s. d.
17)93(5 6 Anſ.
85
.8
12
17)102(6*d.*
102

(64) £. s. d.
4 0 6
20
s. d.
23)80(3 6 Anſ.
69
11
12
23)138(6*d.*
138

(65) £. s. d.
21 0 6
20
s. d.
29)420(14 6
29
130
116
.14
12
29)174(6*d.*
174

(66) £. s. d.
5 19 0
20
s. d.
34)119(3 6
102
.17
12
34)204(6*d.*
204

```
(67)  £. s. d.
       1  7  9
      20
      ---
      27
      12
      ----
 37)333(9d. Anſ.
    333
    ---
```

```
(68)   £.  s.  d.
        4  13  2
       20
       ---s.  d.
  43)93(2   2 Anſ.
     86
     --
      7
     12
     --
  43)86(2d.
     86
     --
```

```
(69)  £.  s.  d.
      24   9  1½
      20
      ----s.  d.
 39)489(12 6½
    39
    --
     99
     78
     --
     21
     12
     --
 39)253(6d.
    234
    ---
     19
      4
     --
 39)78(½qrs.
    78
    --
```

```
(70)  £.  s.  d.
       3  12  5½
      20
      ---s.  d.
  47)72(1  6½
     47
     --
     25
     12
     --
  47)305(6d.
     282
     ---
      23
       4
      --
  47)94(½qrs.
     94
     --
```

```
(71)  £.  s.  d.
       1  19  9
      20
      --
      39
      12
 53)477(9d.
    477
```

```
(72)   £.  s.  d.
       19  3   6
       20 s.  d.
 59)383(6   6
    354
     29
     12
 59)354(6d.
```

```
(73)  £.  s.  d.
       5  18  4
      20
      ---- s. d.
   71)118(1  8 Anſ.
      71
      ---
      47
      12
      ---
   71)568(8d.
      568
      ---
```

```
(74)  £.  s.  d.
      19  7   4
      20
      ---- s. d.
   83)387(4  8 Anſ.
      332
      ---
      .55
      12
      ---
   83)664(8d.
      664
      ---
```

```
(75)  £.  s.  d.
      29  13  4
      20
      ---- s. d.
   89)593(6  8
      534
      ---
      .59
      12
      ---
   89)712(8d.
      712
      ---
```

```
(76)  £.  s.  d.
      32  6   8
      20
      ---- s. d.
   97)646(6  8
      582
      ---
      .64
      12
      ---
   97)776(8
      776
      ---
```

```
(77)  £.  s.  d.
      43  5   8
      20
      ---- s. d.
  106)865(8  2
      848
      ---
      .17
      12
      ---
  106)212(2d.
      212
      ---
```

```
(78)  £.  s.  d.
      55  8   2
      20
      ---- s. d.
  109)1108(10  2
      109
      ---
      ..18
      12
      ---
  109)218(2d.
      218
      ---
```

(79)
£. s. d.
34 1 7½
20
s. d.
123)681(5 6½
615
.66
12
123)799(6d.
738
.61
4
123)246(½qrs.
246

(80)
£. s. d. £. s. d.
145)167 19 2(1 3 2 Anſ.
145
.22
20
145)459(3s.
435
.24
12
145)290(2d.
290

(81)
lb. £. s. d.
25¼ 0 18 11¼
4 4
101 3 15 9
20
75
12
101)909(9d. Anſ.
909

(82)
lb. £. s. d.
30½ 3 12 5¼
2 2
61 7 4 10½
20
s. d.
61)144(2 4½
122
.22
12
61)274(4d.
244
.30
4
61)122(½qrs.
122

(83)
Bar. £. *s.* *d.*
35¾ 54 10 4½
4 4
£. *s.* *d.*
143)218 1 6(1 10 6
143
·75
20
143)1501(10*s.*
143
··71
12
143)858(6*d.*
858

(84)
A. £. *s.* *d.*
40½ 1301 1 3
2 2
£. *s.* *d.*
81)2602 2 6(32 2 6
243
·172
162
·10
20
81)202(2*s.*
162
·40
12
81)486(6*d.*
486

(85)
T. £. *s.*
64¼ 167 1
4 4
£. *s.*
257)668 4(2 12
514
154
20
257)3084(12*s.*
257
·514
514

(86)
Yds. £. *s.*
81½ 97 16
2 2
£. *s.*
163)195 12(1 4
163
·32
20
163)652(4*s.*
652

(87)

(87)

```
lb.       £.  s.  d.
108¼      12  12  7
  4                4
----      -----------
433       50  10  4
          20
         ----  s.  d.
433)1010(2     4
    866
    ----
    .144
      12
    ----
433)1732(4d.
    1732
    ----
```

(88)

```
Ells.     £.  s.  d.
120½      40  8   4¼
  2               2
----      -----------
241       80  16  8½
          20
         ----  s.  d.
241)1616(6     8½
    1446
    ----
    :170
      12
    ----
241)2048(8d.
    1928
    ----
    .120
       4
    ----
241)482(½qrs.
    482
    ----
```

(89)

```
Ft.       £.  s.  d.
132¼      8   16  4
  4               4
----      -----------
529       35  5   4
          20
         ----  s.  d.
529)705(1      4
    529
    ---
    176
     12
    ---
529)2116(4d.
    2116
    ----
```

(90)

```
Gal.      £.  s.  d.
144½      66  4   7
  2               2
----      -----------
289       132 9   2
          20
         ----  s.  d.
289)2649(9     2
    2601
    ----
    ..48
      12
    ----
289)578(2d.
    578
    ---
```

(91)
Yds. £. *s.* *d.*
117¼ 149 9 10½
4 4
£. *s.* *d.*
469)597 19 6(1 5 6
469
128
20
469)2579(5*s.*
2345
.234
12
469)2814(6*d.*
2814

(92)
Gal. £. *s.* *d.*
145½ 93 1 2¼
2 2
291 186 2 4¼
20
s. *d.*
291)3722(12 9½
291
.812
582
230
12
291)2764(9*d.*
2619
.145
4
291)582(½*qrs.*
582

(93)
Æ. £. *s.* *d.*
1441½ 86661 3 6¾
2 2
£. *s.* *d.*
2883)173322 7 1½(60 2 4½
17298
...342
20
2883)6847(2*s.*
5766
1081
12
2883)12973(4*d.*
11532
,1441
4
2883)5766(½*qrs.*

(94)
Feet. £. *s.* *d.*
1729¾ 2183 16 2¼
4 4
£. *s.* *d.*
6919)8735 4 9(1 5 3
6919
1816
20
6919)36324(5*s.*
34595
.1729
12
6919)20757(3*d.*
20757

(95)

£. s. d. £. s. d.
365)453 11 9¼(1 . 4 10¼
365
.88
20
365)1771(4*s.*
1460
.311
12
365)3741(10*d.*
365
..91
4
365)365(¼*qrs.*
365

(96)

Yds.
13½
2
27

£. s. d.
4894 2 3¾
2
{9)9788 4 7½
{3)1087 11 7½
£.362 10 6½

(97)

£. s. d. £. s. d.
9652)40669 2 1(4 4 3¼
38608
.2061
20
9652)41222(4*s.*
38608
.2614
12
9652)31369(3*d.*
28956
.2413
4
9652)9652(¼*qr.*
9652

(98)

£. s. d.
2264 0 0
1122 19 10¾

£. s. d.
365)1141 0 1¼(3 2 6¼
1095
..46
20
365)920(2*s.*
730
190
12
365)2281(6*d.*
2190
..91
4
365)365(¼*qr.*
365

(99)

C. qr. lb. C. qr. lb.

37)312 0 21(8 1 21
296
. 16
4
37)64(1qr.
37
27
28
217
56
37)777(21lb.
74
. 37
37

(100)

C. qr. lb. C. qr. lb.

109(1019 3 20(9 1 12
981
. 38
4
109)155(1qr.
109
. 46
4×7=28
184
7
109)1308(12lb.
109
. 218
218

DUODECIMALS.

ANSWERS*.

(1)
F. I.
6 6
3 2
19 6
1 1 0
20 7 0 Anſ.

(2)
F. I.
8 4
5 3
41 8
2 1 0
43 9 0 Anſ.

(3)
F. I.
12 6
8 5
100 0
5 2 6
105 2 6

(4)
F. I.
26 4
12 7
316 0
15 4 4
331 4 4

---

* Theſe examples are all proved by Practice.

	F.	I.	
(5)	76	6	
	48	3	
	3672	0	
	19	1	6
	F.3691	1	6

	F.	I.	
(6)	45	6	
	38	7	
	1729	0	
	26	6	6
	F.1755	6	6

	F.	I.	
(7)	84	2	
	79	2	
	6649	2	
	14	0	4
	F.6663	2	4

	F.	I.	
(8)	126	6	
	121	3	
	15306	6	
	31	7	6
	F.15338	1	6

	F.	I.	
(9)	764	5	
	192	4	
	146768	0	
	254	9	8
	F.147022	9	8

	F.	I.	
(10)	7681	8	
	1926	10	
	14794890	0	
	6401	4	8
	F.14801291	4	8

	F.	I.	P.		
(11)	7	3	3		
	1	7	6		
	7	3	3		
	4	2	10	9	
		3	7	7	6
	F.11	9	9	4	6

	F.	I.	P.		
(12)	8	6	6		
	7	3	4		
	59	9	6		
	2	1	7	6	
		2	10	2	0
	F.62	1	11	8	0

	F.	I.	P.		
(13)	4	10	6		
	2	4	8		
	9	9	0		
	1	7	6	0	
		3	3	0	0
	F.11	7	9	0	0

	F.	I.	P.		
(14)	7	8	6		
	7	2	8		
	53	11	6		
	1	3	5	0	
		5	1	8	0
	F.55	8	0	8	0

F. I. P.
(15) 3 6 3
2 4 6
7 0 6
1 2 1 0
1 9 1 6
F. 8 4 4 1 6

F. I. P.
(16) 12 2 10
9 6 4
110 1 6
6 1 5 0
4 0 11 4
F. 116 6 11 11 4

F. I. P.
(17) 84 7 6
76 3 3
6431 6 0
21 1 10 6
1 9 1 10 6
F. 6454 5 0 4 6

F. I. P.
(18) 87 3 5
18 1 6
1571 1 6
7 3 3 5
3 7 7 8 6
F. 1580 0 5 1 6

F. I. P.
(19) 371 2 3
181 1 3
67184 11 3
30 11 2 3
7 8 9 6 9
F. 67223 7 2 9 9

F. I. P.
(20) 487 10 10
186 5 6
90749 11 0
203 3 6 2
20 3 11 5 0
F. 90973 6 5 7 0

F. I.
(21) 18 6
1 2
18 6
3 1 0
F. 21 7 0

F. I.
(22) 45 6
9 4
409 6
15 2 0
F. 424 8 0

	F.	I.	
(23)	64	6	
	47	8	
	3031	6	
	43	0	0
	9)3074	6	0
Yds.	341	5	6

	F.	I.		
(24)	864	3		
	62	6		
	53583	6		
	432	1	6	
	9)54015	7	6	
Yds.	6001	6	7	6

	F.	I.		
(25)	60	9		
	22	3		
	1336	6		
	15	2	3	
	9)1351	8	3	
Yds.	150	1	8	3

	F.	I.		
(26)	40	6		
	9	3		
	364	6		
	10	1	6	
	9)374	7	6	
Yds.	41	5	7	6

	F.	I.	P.		
(27)	3	8	9		
	1	4	6		
	3	8	9		
	1	2	11	0	
		1	10	4	6
	5	1	6	4	6

	F.	I.	P.		
(28)	3	7	9		
	1	5	1		
	3	7	9		
	1	6	2	9	
			3	7	9
	5	2	3	4	9
					3×5=15
	15	6	10	2	3
					5
F.	77	10	2	11	3

(29)

F. I.
(29) 1 6
1 3
1 6
4 6
1 10 6
16 3 long
30 0 0
5 7 6
F.30 5 7 6

F. I. P.
(30) 1 5 6
1 2 10
1 5 6
2 11 0
1 2 7 0
1 9 7 7 0
12 3 7 long
21 7 7 0 0
5 4 10 9 0
1 0 7 5 1 0
F.22 2 0 6 2 1

REDUCTION.

ANSWERS.

(1) *s.*
20
12
240 pence
4
Anſ. 960 farthings.

(2) *qrs.*
4)960
12)240
20*s.* Anſ.

(3) £.
36
20
720
12
8640
4
34560

(4) *qrs.*
4)34560
12) 8640
2|0) 72|0
£.36

(5) £. s. d.
346 6 $8\frac{1}{4}$
20
6926
12
83120
4
332481 Anſ.

(6) *qrs.*
4)332481
12) 83120—$\frac{1}{4}$
2|0) 6921|6—8*d.*
£.346 6 $8\frac{1}{4}$ Anſ.

(7) *G.*
86
3×7=21*s.*
258
7
1806
12
21672
4
86688

(8) *qrs.*
4)86688
12)21672
$$21\begin{cases}3)\ 1806\\7)\ 602\end{cases}$$
G. 86

(9) £.
384
60
23040

(10) *Groats.*
6|0)2304|0
£.384

(11) *Moidores.*
682
3×9=27
2046
9
18414
12
220968
4
883872

(12) *qrs.*
4)883872
12)220968
$$27\begin{cases}9)\ 18414\\3)\ 2046\end{cases}$$
682

(13)

(13) £.
1000
4
4000 Crowns
2
8000 Half crowns
30
Ans. 240000 Pence

(14) *d.*
3|0)24000|0
2)8000
4)4000
£. 1000 Ans.

(15) £.
234
4
936 Crowns
5
4680 Shillings.
3
14040 Groats
4
56160 Pence

(16) *d.*
4)56160
3)14040
5)4680
4)936
£.234

(17) £.
152
20
5)3040 Shillings
608 Crowns

(18) *Crowns.*
608
5
2|0)304|0
£.152

(19)
s. *d.*
4 9
12
57

£. *s.*
695 8
20
13908
12
57)166896(2928 Duc.
114
528
513
159
114
456
456

(20)
s. *d.*
4 9
12
57

Duc.
2928
57
20496
14640
12)166896
2|0)1390|8
£.695 8 0

(21)

```
            £.     s.  d.
           4321   13   9
             20
          ------
          86433
             12
         -------
13½      1037205
  2            2
---      -------
27   { 3)2074410
     {   -------
     { 9) 691470
          ------
   Anſ. 76830 Pieces
```

(22)

```
     76830
       9×3=27
    ------
    691470
         3
   -------
 2)2074410
 ---------
12)1037205
 ---------
2|0) 8643|3—9
    ---------
    £.4321  13  9 Anſ.
```

(23)

```
  G.
  36
  16
 ----
 576
   4
 ----
2304
```

(24)

```
    Quar. G.
     4)2304
     ------
   { 6) 576
36 {    ---
   { 6)  96
        ---
         16
```

(25)

```
          £.    s.  d.
         993    4   6
          20
        -----
s. d.   19864
 4 3       12
12      ------
--
51     )238374(4674 Anſ.
        204
        ----
        ·343
         306
         ----
         ·377
          357
          ----
          ·204
           204
```

(26)

```
      4674
        51
     -----
      4674
    23370
   -------
 12)238374
   -------
2|0) 1986|4—6d.
    £.993  4  6
```

```
        (27)
      £.   s.   d.
     357   11   10½
      20
   ------
    7151
      12
   ------
   85822
       4
   ------
  343290
     360
  --------
  205974
 102987
 ---------
 123584400 Anſ.
```

```
        (28)
      £.   s.   d.
     357   11   10½
      20
   ------
    7151
      12
   ------
   85822
       4
   ------
 343290)123584400(360 Anſ.
        1029870
        -------
        .2059740
         2059740
         -------
               0
```

```
 s. d.    (29)
 5  0              £.  s.
 2  6             426  14
 1  0              20
 ----            -----
 8  6             8534
12                  12
 ----           -------
            102)102408(1004
                102
                ---
                ...408
                   408
                   ---
```

```
(30)  Crowns.     £.   s.
      4)1004(251   0
       8)1004(125  10
     2|0)100|4( 50  4
         ---------------
            £.426  14
```

```
  d.    (31)   £.  s. d.
 13½            58  2  6
 12             20
  9           -----
  6            1162
  4              12
  2           ------
 ----          13950
 46½               2
   2          -------
 ----      93)27900(300
   93          279
               ---
               ...00
```

```
(32)   300                d.
        93               13½
     ------              12
       900                9
      2700                6
     ------               4
    2)27900               2
     ------             ----
   12)13950              46½
     ------               2
  2|0)116|2 6           ----
     ------              93
     £.58  2  6
```

(33)

s. d.
4 3
12
51

d.
1120
51
1120
5600
12)57120
2|0) 476|0
£. 238 Anſ.

(34)

£.
238
20
4760
12
)57120(1120 Anſ.
51
.61
51
102
102
0

s. d.
4 3
12
51

(35)

Piſt.
560
17
2|0)952|0
£.476

(36)

£.
476
20 *Piſt.*
17)9520(560
85
102
102
0

(37)

s. d.
5 3
12
63

Q.G.
800
9×7=63
7200
7
12)50400
2|0)420|0
£.210

(38)

£.
210
20
4200
12

s. d.
5 3=63 { 7)50400
9) 7200 }
Q.G. 800

(39)

s. d.
6 8
12
80

Nobles.
896
80
12)71680
2|0) 5971|3—4*d.*
£.298 13 4 Anſ.

(40)

£. s. d.
298 13 4
20
5973
12
s. d.
6 8=8|0)7168|0
Nob. 896 Anſ.

(41)

G.
225
3×7=21
675
7
£. s. s.
1 7=27 { 3)4725
9)1575
M. 175

(42)

Moid.
175
3×9=27
525
9
21 { 3)4725
7)1575
G. 225

(43)

Piſt.
170
17=1 *piſt.*
5)2890
C. 578

(44)

Crowns.
578
5
17)2890(170
17
119
119
0

(45)

(44)

s. *d.*
5 6½
12
66
2
133

Cobs.
14630
110
133)1609300(12100 Ans.
133
·279
266
·133
133
00

s. *d.*
4 7
12
55
2
110

(46)

s. *d.*
4 7
12
55
2
110

Duc.
12100
133
36300
36300
12100
110 { 11)1609300
10) 146300
Cobs. 14630 Ans.

s. *d.*
5 6½
12
66
2
133

(47)

s. *d.*
6 8½
12
80
2
161

s. *d.*
7 6
12
90
2
180

644
180
161)115920(720 Ans.
1127
··322
322
0

(48)

s. *d.*
6 8½
12
80
2
161

s. *d.*
7 6
12
90
2

Mil.
720
161
720
4320
720
18|0)11592|0(644
108
··79
72
·72
72

(49) *lb.*
23
12
276
20
5520
4×6=24
22080
6
132480 Anſ.

(50) *Grs.*
24 { 6)132480
4) 22080
2|0)552|0
12)276
lb. 23 Anſ.

(51) *lb. oz. dwt. gr.*
18 6 8 4
12
222
20
4448
6×4=24
26688
4
106756

(52) *Grs.*
24 { 4)106756
6) 26689—0 }
2|0)4441|8—1 } 4 *grs.*
12)222—8*dwt.*
18 6 8 4 Anſ.

(53) *lb. oz. dwt. gr.*
3 4 2 9
12
40
20
802
4×6=24
3208
6
19257
8
154056

(54) *lb. oz. dwt. gr.*
3 4 2 9
12
40
20
802
4×6=24
3208
6
19257)154056(8 *ingots*
154056

(55) *oz. dwt. grs.*
55 9 14
20
1109
4×6=24
4436
6
26630

lb. oz. dwt. gr.
41 7 6 6
12
499
20
9986
4×6=24
39944
6
26630)239670(9 Anſ.
239670

(56) *oz. dwt. grs.*
55 9 14
20
1109
4×6=24
4436
6
26630
9
24 { 6)239670
4) 39945—0 } 6 *grs.*
2|0)998|6--1
12) 499—6
lb. 41 7 6 6

(57) *lb.*
24
12
288
8
2304
3
6912
20
Grs. 138240

(58) *Grs.*
2|0)13824|0
3) 6912
8)2304
12) 288
lb. 24

(59) *lb. oz. dr. ſc. gr.*
421 6 3 2 9
12
5058
8
40467
3
121403
20
grs. 2428069 Anſ.

(60) *Grs.*
2|0)242806|9
3)121403—9*grs.*
8)40467—2*ſc.*
12)5058—3*dr.*
lb. 421 6 3 2 9

(61) *lb. oz.*
12 6
12
150
8
1200
3
4)3600
45 { 9) 900 boluſes
45 { 5) 100
20 each.

(62) *Bol.*
20
5×9=45
100
9
900
4
3)3600
8)1200
12)150
lb. 12 6

(63) *T.*
16
20
320
4
1280
4×7=28
5120
7
35840
16
573440
16
drs. 9175040

(64) *drs.*
16 { 4)9175040
16 { 4)2293760
16 { 4)573440
16 { 4)143360
28 { 7)35840
28 { 4) 5120
4)1280
2|0)32|0
T. 16

(65) *T.* *C.* *Q.* *lb.* *oz.dr.*
146 12 2 8 4 6
20
2932
4
11730
4×7=28
46920
7
328448
16
5255172
16
*dr.*84082758 Anſ.

(66) *Drs.*
16 { 4)84082758
4)21020689—2 } 6*dr.*
16 { 4)5255172—1
4)1313793—0 } 4*oz.*
28 { 7)328448—1
4) 46921—1 } 8*lb.*
4)11730—1
2|0)2931|2—2*qrs.*
*T.*146 12 2 8 4 6

(67)
C. *qrs.* *lb.*
7 2 21
4
30
4×7=28
120
7
861
7
*lb.*6027

(68)
C. *qrs.* *lb.*
7 2 21
4
30
4×7=28
120
7
861)6027(7*hhd.*
6027

(69)

```
(69)              C.  qr. lb. oz.
                  41   1  18   2
                   4
                 ----
                 165
                   7×4=28
                ------
                 1155
                    4
lb. oz.         ------
12  13           4638
16                 16
----           -------
205            )74210(362 Anſ.
                615
                ----
                1271
                1230
               -----
               ..410
                 410
                 ---
```

```
(70)     Parc.               lb. oz.
          362                12  13
          205                16
         -----              ----
         1810               205
         7240
        ------
     16 { 4)74210
        {   ----
        { 4)18552—2 }
            ------   } 2oz.
     28 { 4)4638—0  }
        {   ----
        { 7)1159—2  }
            ----     } 18lb.
          4) 165—4  }
             ---
         C.41   1  18  2 Anſ.
         ------------------
```

```
(71)          C.  qr. lb.
               4   2   8
               4
             ----
              18
               4×7=28
             ----
lb.           72
4              7
6            ----
10           512
12             4
--           ----
32  { 4)2048
    {    ----
    { 8) 512
         ----
          64
         ----
```

```
(72)       lb.
            4
            6
           10
           12
          ----
           32
            8×8=64 parcels
          ----
          256
            8
         -----
        4)2048
          ----
    28 { 4) 512
       {    ----
       { 7) 128—0 }
            ----   } 8lb.
         4)  18—2 }
            ----
         C.4   2   8
         ---------
```

(73) *Yds.*
342
4
1368
4
N. 5472 Anſ.

(74) *Nails.*
4)5472
4)1368
Yds. 342 Anſ.

(75) *Yds.* *qr.* *na.*
62 2 1
4
250
4
N. 1001 Anſ.

(76) *Nails.*
4)1001
4) 250—1 *nail*
Yds. 62 2 1

(77) *E. E.* *qr.* *na.*
40 3 2
5
203
4
N. 814

(78) *Nails.*
4)814
5)203— 2 *nails*
E. E. 40 3 2

(79) *F. E.* *qr.* *na.*
84 2 3
3
254
4
N. 1019

(80) *Nails.*
4)1019
3) 254—3
F. E. 84 2 3

(81) *Yds.*
52
4
208
4
832
6×6=36
4992
6
*N.*29952 Ans.

(82) *Yds.*
52
4
208
4
832)29952(36 Ans.
2496
4992
4992

(83) *Boys.*
$\frac{1}{4}$)90
$3\frac{1}{4}$
270
$22\frac{2}{4}=\frac{1}{2}$
Yds. $292\frac{1}{2}$

(84) *Yds.* *qr.*
90 { 10)292 2
9) 29 1
Yds. 3 1

(85) *Lea.*
1
3
3 miles
8
24 furlongs
40
960 poles

(86) *Poles.*
4|0)96|0
8)24
3) 3
*L.*1 Ans.

(87) *Miles.*
48
8
384 furl.
40
½)15360 poles
5½
76800
7680
84480 yards
3
253440 feet
12
3041280 inches
3
Anſ. 9123840 bar. corns

(88) *B. Corns.*
3)9123840
12)3041280
3)253440
84480
2
11)168960
4|0) 1536|0
8) 384
Miles. 48 Anſ.

(89) *Yds.*
1760
5×5=25
8800
5
44000
6=½ft. in 1 y.
33 { 11) 264000
3) 24000
8000

16½
2
33

(90)
8000
11×3=33
88000
3
6)264000
176|0)4400|0(25 miles
352
880
880

(91) *Miles,*
25020
1056=paces in 1 mile
150120
125100
250200
26421120 paces
5
132105600 ſeet
12
1585267200 inches
3
Anſ.4755801600 barley corns

(92)
3)4755801600
12)1585267200
5) 132105600
1056)26421120(25020 Anſ.
2112
5301
5280
2112
2112

(93) *A.*
484
4
1936
40
77440 poles

(94) *Poles.*
4|0)7744|0
4)1936
*A.*484

(95) *A. R. P.*
4321 3 34
4
17287
40
691514 *Poles*

(96) *Poles.*
4|0)69151|4
4)17287—34
*A.*4321 3 34

(97) *A.*
4140
4
16560
40
360 { 10)662400
9)66240
4) 7360
Shares 1840 Anſ.

(98) *Shares.*
1840
4×9×10=360
7360
9
66240
10
4|0)66240,0
4)16560
A. 4140 Anſ.

(99) *Hhds.*
46
9×7=63
414
7
2898
8
Pints 23184

(100) *Pints.*
8)23184
63 { 7)2898
9)414
Hhd. 46

(101) *T. hhd. g. qt pi.*
46 3 45 3 1
4
187
9×7=63
1683
7
11826
4
47307
2
94615 Pints

(102) *Pints.*
2)94615
4)47307—1 pint
63 { 7)11826—3 qts.
9) 1689—3 } =45 gals.
4) 187—6 }
Tons 46 3 45 3 1

(103) *Hbls.*
15
9×7=63
qts. *pi.*
12 12
2
36
135
7
945
8
36 { 6)7560
6)1260
Anſ. 210 dozen of each

(104) *Dozen.*
210
6×6=36 pts.
1260
6
8)7560
63 { 7)945
9)135
Hbd. 15 Anſ.

(105) *Hbd.*
21
12×4=48
252
4
1008
8
8064

(106) *Pints.*
8)8064
48 { 4)1008
12) 252
21 Hhd.

(107) *Hbd.*
30
6×9=54
180
9
1620
8
12960

(108) *Pints.*
8)12960
54 { 9)1620
6) 180
30

(109)

(103) *Bar.*
363
2
3)726
242 hdds.
6×9=54
1452
9
13068 gallons
8
Anſ. 104544 pints

(110) *Pints.*
8)104544
54 { 9)13068 gall.
54 { 6) 1452
242 hhds.
3
2)726 kilderkins
Anſ. 363 barrels.

(111)

Gal.
54=1 hhd.
36=1 barrel
9=1 firkin
99
4
396

Butt. hhd g. qt.
6 1 40 2
2
13
9×6=54
117
6
742
4
396)2970(7 of each ſort
2772
. 198 quarts over

(112) *Gal.*
1 hhd. =54
1 bar. =36
1 firk. = 9
99
7
693
4
2772
rem. liq. 198
4)2970
54 { 6)742 2
9)123 4 }
2)13 6 } 40
Butts 6 1 40 2 Anſ.

(113) *qrs.*
304
8
2432
8
19456 Anſ.

(114) *Gal.*
8)19456
8)2432
304

(115) *Laſts.*
4
10
40
8
320
8
2560
8
20480

(116) *Pints.*
8)20480
8)2560
8)320
10)40
Laſts 4 Anſ.

(117) *L. W. Q. B. P. G.*
2 1 3 2 3 1
2
5
5
28
8
226
4
907
2
Gal. 1815 Anſ.

(118) *Gal.*
2)1815
4)907—1
8)226—3
5)28—2
2)5—3
Anſ. 2 1 3 2 3 1

(119) *Chal.*
124
6×6=36
744
6
4464
4
17856

(120) *Pecks.*
4)17856
36 { 6)4464
36 { 6) 744
124

(121) *Chal. bu.*
421 12
6×6=36
2526
6
3)15168
Sacks 5056

(122) *Sacks.*
5056
3
36 { 6)15168
36 { 6)2528
421 12

(123) *Days h. m. ſec.*
365 5 48 55
6×4=24
2190
4
8765
60
525948
60
Sec. 31556935

(124) *Seconds.*
6|0)3155693|5
6|0)52594|8 55 ſec.
24 { 4)8765 48 mi.
24 { 6) 2191—1 }
365—1 } 5 h.
Anſ. 365 5 48 55

(125)

(125)

4007 years before Chriſt
1785 —— ſince Chriſt
5792

31556935 ſeconds in 1 year
5792
63113870
284012415
220898545
157784675
Anſ. 182777767520 *Seconds.*

(126)

Seconds. *Years.*
31556935)182777767520(5792 Anſ.
157784675
.249930925
220898545
.290323802
284012415
..63113870
63113870

(127) *Rev.*
12
12
144
30
4320
60
259200
60
15552000

(128) *Seconds.*
6|0)155520010
6|0)259201|0
3|0)432|0
12)144
12

(129 *R.* *ſ.* *d.* *m.* *ſec.*
41 6 4 30 45
12
498
30
14944
60
896670
60
53800245

(130) *Seconds.*
6|0)5380024|5
6|0)89667|0 45″
3|0)14941|4 30′
12)498 4°
41 6 4 30 45

(131)

(131) *Yd.*
1
9
9
12×12=144
108
12
1296 Anſ.

(132) *Sq. Inches*
144 { 12)1296
12) 108
9)9
1 Anſ.

(133) *F.* *In.*
62 6
12
750

F. *I.*
864 3
12
10371
750
518550
72597
Yd. *Inch* — *Yd.* *F.* *I.* *P.*
1=1296)7778250(6001 6 7 6 Anſ.
7776
...2250
1296
144)954(6 feet.
864
12) 90(7 inch.
84
6 parts

(134) *Mile.*
1
640
640 acres
4
2560 roods
40
¼)102400 poles
30¼
3072000
25600
3097600 yards
9
27878400 feet
12×12=144
334540800
12
4014489600 inches

(135) 144 { 12)4014489600
12) 334540800
9) 27878400
3097600
4
yds *qrs.* 30¼=121 { 11)12390400
11) 1126400
4|0 102400|0
4)2560
640 { 8) 640
8) 80
10) 10
1 mile.

(136) *Yd.*
1
3×9=27
3
9
27 feet
12×12×12=1728
324
12
3 888
12
Anſ. 46656 inches.

(137) *Inches.*
1728 { 12)46656
12) 3888
12) 324
27 { 9)27
3) 3
1 Anſ.

(138) *Inches* *F.* *I.*
Breadth 18 16 3 length
Depth 15 12
270 195
270
13650
390
F. *I.* *pts.* *ſe.*
1728)52650(30 5 7 6
5184
144) 810(5 inches
720
12). 90(7 pts.
84
6 *ſec.*

THE

THE RULE OF THREE DIRECT.

ANSWERS.

(1) Yds. s. Yds.
3 : 18 : : 9
9
3)162
2|0)5|4
£.2 14 Anſ.

(2) £. s. Yds. s.
2 14 : 9 : : 18
20
54
9
54{9)162
6) 18
Anſ. 3 yds.

(3) Yds. £. Yds.
4 : 2 : : 14
2
4)28
£ 7

(4) £. Yds £.
7 : 14 : : 2
2
7)28
4 yds.

(5) Yds. £. Yds.
9 : 3 : : 36
3
9)108
£.12

(6) £. Yd. £.
12 : 36 : : 3
3
12)108
9 yds.

(7) Yds. £. s. Yds.
3 : 2 9 : : 24
20
49
4×6=24
196
6
3)1176
2|0)39|2
£.19 12

(8) £. s. Yds. £. s.
19 12 : 24 : : 2 9
20
392
20
49
4×6=24
196
6
392)1176(3 yds.
1176

(9) *Yds.* £. *s.* *Yd.*
4 : 1 9 : : 48
20
29
4×12=48
116
12
4)1392
2|0)34|8
£. 17 8

(10) £. *s.* *Yd.* £. *s.*
17 8 : 48 : : 1 9
20 20
348 29
4×12=48
116
12
348)1392(4 yds.
1392

(11)
Yds. £. *s.* *d.* *Yds.*
7 : 3 6 6 : : 36
20
66
12
798
6×6=36
4788
6
7)28728
12)4104
2|0)34|2
£. 17 2 Anſ.

(12)
£. *s.* *Yds.* £. *s.* *d.*
17 2 : 36 : : 3 6 6
20 20
342 66
12 12
4104 798
6×6=36
4788
6
4104)28728(7 yds.
28728

(13)

(13)

Yds. *s.* *d.* *Yds.*
8 : 18 8 :: 54
12

224
6×9=54

1344
9

8)12096

12)1512

2|0)12|6

£.6 6 Anſ.

(14)

£. s. *Yds.* *s.* *d.*
6 6 : 54 :: 18 8
20

126
12

1512

12

224
6×9=54

1344
9

1512)12096(8 *yds.* Anſ.
12096

(15)

F. *s.* *d.* F.
9 : 15 9 :: 72
12

189
8×9=72

1512
9

9)13608

12)1512

2|0)12|6

£.6 6

(16

£. *s.* F. *s.* *d.*
6 6 : 72 :: 15 9
20

126
12

1512

12

189
8×9=72

1512
9

1512)13608(9 feet
13608

(17)

lb. £. s. d. lb.
10 : 1 2 1 :: 81
20
22
12
265
9×9=81
2385
9
10)21465
12) 2146—5=½d.
2|0)17|8—10d.
£.8 18 10½ Anſ.

(18)

£. s. d. lb. £. s. d.
8 18 10½ : 81 :: 1 2 1
20
178
12
2146
2
4293

20
22
12
265
2
530
9×9=81
4770
9
4293)42930(10 Anſ.
4293
0

(19)

qr. £. s. qr.
12 : 14 11 :: 90
20
291
90
12)26190
2|0)218|2 6
£. 109 2 6

(20)

£. s. d. qr. £. s.
109 2 6 : 90 :: 14 11
20
2182
12
26190

20
291
12
3492
90
26190)314280(12 qrs.
26190
52380
52380

(21)

(21)

lb. *£.* *s.* *lb.*
14 : 12 5 :: 99
20
245
11×9=99
2695
9
14 { 2)24255
7)12127—1 } $\frac{7}{14}$=6*d.*
2|0) 1731|2—3
£ 86 12 6

(22)

£. *s.* *d.* *lb.* *£.* *s.*
86 12 6 : 99 :: 12 5
20 20
1732 245
12 12
20790 2940
11×9=99
32340
9
20790)291060(14 Anſ.
20790
83160
83160

(23)

lb. *£.* *s.* *d.* *lb.*
15 : 5 18 $1\frac{1}{2}$ :: 108
20
118
12
1417
2
2835
9×12=108
25515
12
15 { 3)306180
5)102060
2)20412
12)10206
2|0)85|0—6*d.*
£.42 10 6

(24)

£. *s.* *d.* *lb.* *£.* *s.* *d.*
42 10 6 : 108 :: 5 18 $1\frac{1}{2}$
20 20
850 118
12 12
10206 1417
2 2
20412 2835
9×12=108
25515
12
20412)306180(15 lb.
20412
102060
102060

(25)

Yds. £. s. d. Yds.
18 : 17 19 $7\frac{1}{2}$ :: 48
20
359
12
4315
2
8631
6×8=48
51786
8
18 { 3)414288
6) 138096
2)23016
12)11508
2|0)95|9
£. 47 19

(26)

£. s. Yds. £. s. d.
47 19 : 48 :: 17 19 $7\frac{1}{2}$

20
959
12
11508
2
23016

20
359
12
4315
2
8631
6×8=48
51786
8
23016)414288(18 Anſ.
23016
184128
184128

(27) E. £. s. d. E.
21 : 5 18 $1\frac{1}{2}$ :: 72
20
118
12
1417
2
2835
9
25515
8
21 { 3)204120
7) 68040
2)9720
12)4860
2|0)40|5=£. 20 5

(28)

£. s. E. £. s. d.
20 5 : 72 :: 5 18 $1\frac{1}{2}$

20
405
12
4860
2
9720

20
118
12
1417
2
2835
9
25515
8
9720)204120(21 ells
19440
..9720
9720

(29)

Pr. £. *s. d.* *pts.*
27 : 8 0 10½ : : 81
20
160
12
1930
2
3861
9×9=81
34749
9
27 { 3)312741
9)104247
2)11583
12)5791—½ qr.
2|0)48|2—7*d.*
£.24 2 7½ Anſ.

(30)

£. *s. d. pr.* £. *s. d.*
24 2 7½ : 81 : : 8 0 10½
20 20
482 160
12 12
5791 1930
2 2
11583 3861
9×9=81
34749
9
11583)312741(27 Anſ.
23166
81081
81081

(31)

Doz. £. *s. d.* *doz.*
45 : 73 2 6 : : 120
20
1462
12
17550
120
45 { 5)2106000
9) 421200
12) 46800
2|0)3900|0
£.195

(32)

£. *doz.* £. *s. d.*
195 : 120 : : 73 2 6
20 20
3900 1462
12 12
46800 17550
120
468|00)21060|00(45 doz.
1872
2340
2340

(33)
qrs. *£.* *qrs.*
56 : 63 :: 144
12×12=144
756
12
56{7)9072
8)1296
£. 162 Anſ.

(34)
£. *qrs.* *£.*
162 : 144 :: 63
9×7=63
1296
7
162)9072(56 qrs. Anſ.
810
972
972

(35)
gal. *£.* *hhd.*
72 : 6 :: 25 gal.
9×6=54
225
6
72{9)8100
8) 900—0
112—4 } $=\frac{36}{72}=10s.$
£.112 10 Anſ.

(36)
£. *s.* *hhd.* *£.*
112 10 : 25 :: 6
20 54 20
2250 100 120
125
1350
120
225|0)16200|0(72 gal.
1575
450
450

(37)

(37)
gr. *£.* *s.* *d.* *gr.*
77 : 12 5 $5\frac{1}{4}$: : 144
20
245
12
2945
4
11781
12×12=144
141372
12
77 { 7)1696464
11) 242352
4)22032
12)5508
2|0)45|19
£.22 19 Ans.

(38)
£. *s.* *gr.* *£.* *s.* *d.*
22 19 : 144 : : 12 5 $5\frac{1}{4}$
20 20
459 245
12 12
5508 2945
4 4
22032 11781
12
141372
12
22032)1696464(77 Ans.
154224
154224
154224

(39)
£. *lb.* *£.* *s.*
6 : 81 : : 15 10
20 20
120 310
9×9=81
2790
9
12|0)2511|0
lb. 209 $\frac{3}{12}$ = $\frac{1}{4}$ *lb.*

(40)
lb. *£.* *s.* *lb.*
209$\frac{1}{4}$: 15 10 : : 81
4 20 4
837 310 324
310
3240
972
837)100440(120*s.*
837
1674
1674
0

(41)
£. s. yds. £. s.
78 15 : 70 : : 38 5
20 20
1575 765
70
1575)53550(34 Anſ.
4725
.6300
6300

(42)
yds. £. s. yds.
34 : 38 5 : : 70
20
765
70
34)53550(1575*s.*=78*l.* 15*s.*Anſ.
34
195
170
.255
238
.170
170

(43)
yds. s. d. yds.
7½ : 17 6 : : 515
2 12 2
15 210 1030
210
10300
2060
15{3)216300
5) 72100
12)14420
2|0)120|1 8*d.*
£60 1 8 Anſ.

(44)
£. s. d. yds. s. d.
60 1 8 : 515 : : 17 6
20 210 12
1201 5150 210
12 1030
14420) 108150(7½*yds.* Anſ.
100940
..7210
2
14420)14420(1
14420

(45)

(45) *oz. dw.* *£. s. d.* *oz. dw. gr.*
3 10 : 1 1 10½ :: 655 4 16
20 20 20
70 21 13104
24 12 4×6=24
1680 262 52416
4 6
1050 314512
1050
15725600
3145120
4)
168|0)33023760|0(196570
168
12)49142—½*qrs.*
1622
1512 2|0)409|5 2*d.*
1103 £.204 15 2½ Anſ.
1008
957
840
1176
1176

£. s. d. *oz. dw. gr.* *£. s. d.*
204 15 2½ : 655 4 16 :: 1 1 10½
20 20 20
4095 13104 21
12 24 12
49142 52422 262
4 26209 4
196570 314512 1050
1050
15725600
3145120
4×6=24)
19657|0)33023760|0(1680
19657
133667 6)420
117942
157256 2|0)7|0
157256
0 *oz.*3 10

(47) *hhd. gal.* *£.* *s.* *d.* *p.* *hhd.* *gal.*
2 19½ : 93 1 2¼ : : 12 1 36
63 20 2
145 1861 25
2 12 9×7=63
291 22334 225
4 7
89337 1611
3222 2
178674 3222
178674
178674
268011
4)
291)287843814(989154
2619
2594 12)247288—½*qrs.*
2328
2663 2|0)2060|7—4*d.*
2619
448 £. 1030 7 4½ Anſ.
291
1571
1455
1164
1164

(48) *£.* *s.* *d.* *p.* *hhd.* *gal.* *£.* *s.* *d.*
1030 7 4½ : 12 1 36 : : 93 1 2¼
20 2 20
20607 25 1861
12 9×7=63 12
247288 225 22334
4 7 4
989154 1611 89337
1611
89337
89337
536022
89337
gal. hhd. gal.
989154)143921907(145½=2 19½ Anſ.

(49)

C. qr. lb.
5 2 18
10

lb. s. d.
16½ : 8 11¼ : : 56 2 12
2 12 4
33 107 226
4 4×7=28
429 904
7
6340
2
12680
429
114120
25360
50720
33{ 11)5439720
3)494520
4)164840
12)41210
2|0)3431|4—2*d.*
£. 171 14 2 Anſ.

(50)

C. qr. lb.
5 2 18
10

£. s. d. *s. d.*
171 14 2 : 56 2 12 : : 8 11¼
20 4 12
3434 226 107
12 28 4
41210 1820 429
4 452
164840 6340
429
57060
12680
25360
164840)2719860(16½*lb.* Anſ.

(51)

C. qr. lb.
8 1 12
9

C. qr. lb. oz. £. s.
1 3 13 4 : 15 10 :: 75 0 24
4 20 4
7 300 300
28 4×7=28
209 1200
16 7
3348 8424
16
134784
310
1347840
404352
s.
3348)41783040(12480=£.624

(52)

C. qr. lb.
8 1 12
9

£. *£. s.*
624 : 75 0 24 :: 15 10
20 4 20
12480 300 310
4×7=28
1200
7
8424
310
84240
25272
lb. oz. C. q. lb. oz.
1248|0)261144|0(209 4=1 3 13 4
2496
·11544
11232
··312
16
1248)4992(4*oz.*
4992

(53)

C. qr. lb. oz.
8 3 6 4
5

C. qr. lb. oz. £. s. d.
4 2 6 8 : 24 16 $8\frac{1}{4}$: : 44 0 3 4
4 20 4
18 496 176
28 12 4×7=28
510 5960 704
16 4 7
8168 23841 4931
78900 16
21456900 78900
190728
166887

£. s. d.
8168)1881054900(230295=239 17 $9\frac{1}{4}$ $\frac{5340}{8168}$ Anſ.

(54)

C. qr. lb. oz.
8 3 6 4
5

£. s. d. £. s. d.
239 17 $9\frac{3}{4}$ $\frac{5340}{8168}$: 44 0 3 4 : : 24 16 $8\frac{1}{4}$
20 4 20
4797 176 496
12 4×7=28 12
57573 704 5960
4 7 4
230295 4931 23841
8168 16 8168
1842360 78900 190728
1381770 143046
230295 23841
1842360 190728
1881049560 194733288
+5340 78900
1881054900 15363259959200
1557866304
1363133016
188105491|00)153644564232|00(8168 *oz.* Anſ.

(55)

gal. £. *s.* *d.* *T.* *hhd.* *gal.*
252 : 50 8 $6\frac{3}{4}$ :: 12 3 46
20 4
1008 51
12 9×7=63
12102 459
4 7
48411 3259
3259
435699
242055
96822
145233
qr. £. *s.* *d.*
252)157771449(626077=652 3 $3\frac{1}{4}\,\frac{45}{252}$ Anſ.

(56)

£. *s.* *d.* *T.* *hhd.* *gal.* £. *s.* *d.*
652 3 $3\frac{1}{4}\,\frac{45}{252}$: 12 3 46 :: 50 8 $6\frac{3}{4}$
20 4 20
13043 51 1008
12 63 12
156519 199 12102
4 306 4
626077 3259 48411
252 252
1252199 96822
3130385 242055
1252154 96822
157771449 12199572
3259
109796148
60997860
24399144
36598716
gal.
157771449)39758405148(252 Anſ.

(57)

```
£.  s. d.    C. q. lb.oz.       £.   s.  d.
69  18 7  :  1  1  7  4  ::  560   10  4¼
20           4                20
----         --            -----
1398         5             11210
  12         28               12
-----        ---           ------
16783        147           134524
    4         16                4
------       ----          ------
67132        2356          538097
                             2356
                          -------
                          3228582
                         2690485
                        1614291
                       1076194
                ------------------ 16=4×4)
          67132)1267756532(18884
                67132         ------
                -----         4)4721  0 }
              ·596436         ------    } 4 oz.
               537056      {7(1180    1 }
               ------      {  ------
              ·593805      {  4)168  4 }
               537056            ----    } 4lb.
               ------          4)42   0 }
              ·567493          ----
               537056       C.10  2  4  4 35844/67132
               ------       ----------------------
               ·304372
                268528
                ------
                ·35844
```

(58)

```
  C. qr. lb. oz.                £.   s.  d.      C. qr. lb. oz.
  10  2   4  4 35844/67132  :  560  10  4¼  ::  1   1   7   4
      4                          20                 4
    ---                        -----              ---
     42                        11210                5
       4×7=28                     12               28
    ---                        -----              ---
    168                       134524              147
      7                            4               16
    ---                       ------              ---
   1180                       538097             2356
     16                                         67132
   ----                                        ------
  18884                                          4712
  67132                                         7068
  -----                                        2356
  37768                                       16492
 56652                                       14136
18884                                        ---------
132188                                       158162992
113304                                          538097
----------                                   ---------
1267720688                                  1107140944
     35844                                 1423466928
----------                                1265303936o
1267756532                                474488976
                                        790814960
                                        ------------------4)
                          1267756532)85107031506224(67132
                                     7606539192          -----
                                     ----------        12)16783
                                     .9041639586          -----
                                      8874295724       2|0)139|8   7
                                      ----------           ---
                                     .1673438622        £.69   18   7
                                      1267756532          -----  ---
                                      ----------
                                     .4056820902
                                      3803269596
                                      ----------
                                     .2535513064
                                      2535513064
                                      ----------
```

(59)

```
                         (59)
 yds.    £. s.  d.          packs.
  24  :  8  17  6¾   ::   24
         20                4×6=24 parcels
        ---              ---
        177               96
         12                6
        ---              ---
       2130              576
          4               40
       ----             -----
       8523             23040
                           10×12=120 yds.
                       ------
                       230400
                           12
                      -------
                      2764800 yards
                         8523
                      -------
                      8294400
                     5529600
                    13824000
                   22118400
                  -----------
       ⎧ 4)23564390400
    24 ⎨    -----------
       ⎩ 6) 5891097600
         4)  981849600
        12)  245462400
       2,0)  2045520,0
          £. 1022760 Anſ.

 (60)  £.          packs.      £.  s.  d.
      1022760   :    24    ::   8  17  6¾
           20        24        20
     --------       ---       ---
     20455200       576       177
           12        40        12
    ---------     -----      ----
    245462400     23040      2130
            4       120         4
   ----------    ------      ----
    981849600    460800      8523
                  23040
                -------
                2764800
                   8523
                -------
                8294400
               5529600
              13824000
             22118400
            -----------
 9818496|00)235643904|00(24 yds. Anſ.
```

(61)

```
lb.  oz. drs.   £. s. d.       T.  C. qr. lb. oz.
43    6   3  :  2  5  1¼  ::  4   6   2   4   6
16             20             20
---            ---            ---
694            45             86
 16            12              4
---            ---            ---
11107          541            346
                 4.             4×7=28
               ---            ---
               2165           1384
                                 7
                              ----
                              9692
                                16
                              ------
                              155078
                                  16
                              -------
                              2481248
                                 2165
                              --------
                             12406240
                            14887488
                           2481248
                          4962496
                          ----------       4)
          11107)5371901920(483650
                44428               --------
                -----           12)120912 ½d.
                .92910              -------
                 88856         2|0)1007|6
                 -----              -----
                .40541          £.503 16 0½ 1370/11107 Ans.
                 33321              -------
                 -----
                .72209
                 66642
                 -----
                .55672
                 55535
                 -----
                ..1370
```

(62)

(62)

```
   £.  s.  d.              T. C. qr. lb. oz.      £. s. d.
  503  16  0½ 1370/11107 :  4  6  2   4   6  ::  2  5  1¼
```

```
       20
   ------
    10076
       12
   ------
   120912
        4
   ------
   483650
    11107
 --------
  3385550
 4836500
 483650
483650
----------
5371900550
    +1370
----------
5371901920
```

```
      20
     ---
      86
       4
     ---
     346
         4×7=28
     ---
    1384
       7
    ----
    9692
      16
  ------
  155078
      16
 -------
 2481248
```

```
          20
         ---
          45
          12
         ---
         541
           4
        ----
        2165
       11107
      ------
       15155
     21650
     2165
    2165
   ---------
    24046655
     2481248
   ---------
   192373240
  96186620
 48093310
24046655
192373240
96186620
48093310
------------- drams.
5371901920)59665714625440(11107 Ans.
           5371901920
           ----------
            5946695425
            5371901920
            ----------
             5747935054
             5371901920
             ----------
             37603313440
             37603313440
             -----------
```

(63)

(63)

£. s.
240 2
42

C. qr. lb. £. s. lb.
16 2 14 : 282 2 : : 1

4
66
28
542
132
1862

20
1862)5642(3*s.* $0\frac{1}{4}$*d.*$\frac{826}{1862}$ Anſ.
5586
..56
12
672
4
1862)2688($\frac{1}{4}$
1862
.826

(64) *s. d. lb.* £. *s.*
3 $0\frac{1}{4}\frac{826}{1862}$: 1 : : 282 2

12
36
4
145
1862
296
872
1168
145
270816

20
5642
12
67704
4
270816
1862
541632
1624896
2166528
270816 7 × 4 = 28)
270816)504259392(1862
270816
2334433
2166528
.1679059
1624896
..541632
541632 -

4)266 0
4) 66 2 } 14 lb.
C.16 2 14

If you would know at what rate you muſt ſell your goods by retail, ſo as to make a propoſed gain by the whole, add the money you would gain to the ſum the whole goods coſt you, and then ſtate your queſtion as above.

(65)
£.
Coſt 482
Charges 173
Gain 260

72 : 915 : : 12
12

$72\begin{cases}8)10980\\9)1372\quad 4\\152\quad 4\end{cases}\frac{36}{72}=10s.$

£.152 10 0 Anſ.

(66)
£. s. T. £.
152 10 : 12 : : 915
20 20

3050 18300
12

3050)219600(72 An.
21350
..6100
6100

(67)
£.
180
15
yds. yd.
* 400 : 165 : : 1
20

4|00)33|00
s. 8 1
12

4)12

3 Anſ. 8*s.* 3*d.*

(68)
s. d. yd. £.
8 3 : 1 : : 165
12 20

99 3300
12

$99\begin{cases}11)39600\\9)\ 3600\end{cases}$

400 *yds.*

---

* If at any time damage hath happened to any goods, ſo as to make a propoſed loſs by the whole, then the ſaid loſs muſt be ſubtracted from the coſt, and the remainder made the ſecond term as above.

(69)

(69)

Pieces.
$\frac{1}{2}$)552
85$\frac{1}{2}$

2760
4416
276=$\frac{1}{2}$

yds. *yds.*
57 : 47196 : : 41
41

47196
188784

57)1935036(33948 *yds.* Anſ.
171
·225
171
·540
513
·273
228
·456
456

(70)

Pieces.
$\frac{1}{2}$)552
85$\frac{1}{2}$

2760
4416
276

yds. *yds.*
33948 : 41 : : 47196
41

47196
188784

33948)1935036(57 *yds.*
169740
·237636
237636

(71)

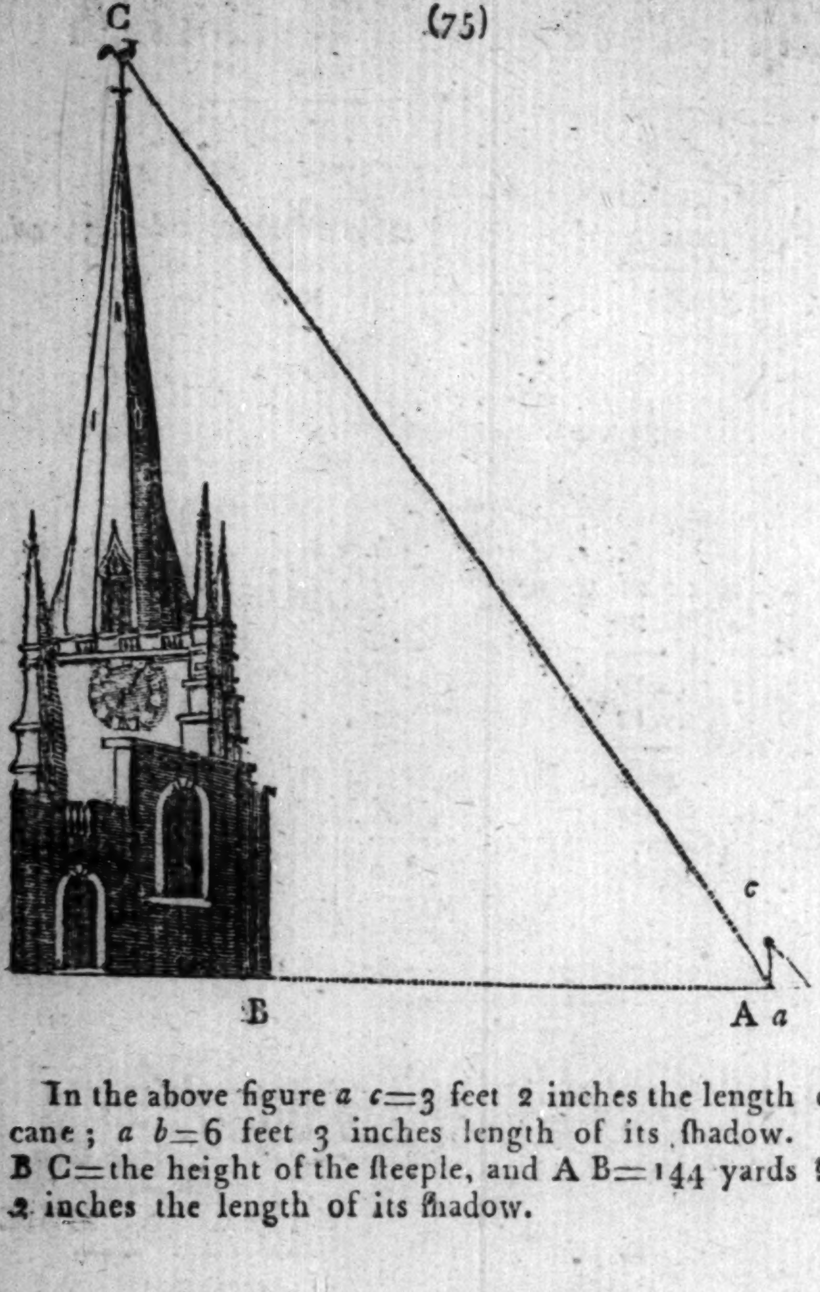
```
        (71)                                     (72)
  s. d.  ell.      £.  s. d.          pieces  £.  s. d.    ell.
  3 4 : 1 : :    443  6 8               95 : 443  6 8 : : 1
  12              20                    28    20
 ----            -----                 ----  -----
  40             8866                  760   8866
                   12                  190     12
                -------                ----  -----
        4|0)1064|0|0             266|0)10640|0(40d.= 3s. 4d.
                -------                  1064
     ⎧ 4)2660                            1064
  28 ⎨   -----                           -----
     ⎩ 7) 665
          -----
     Anſ. 95 pieces.
          -----
```

```
        (73)
  s.  d.  yds.        £.  s.  d.
  9 6¾ : 1¼ : :      20  16  4¼
  12      4          20
 ----   ----        ----
 114      5         416
   4                 12
 ----               ----
 459                4996
                       4
                    -----
                   19986
                       5
                  -------  4)
             459)99930(217
                 918   -----
                 ---  54 1 2 390/459
                 .813 --------
                 459
                 ----
                 3540
                 3213
                 ----
                 .327
                    4
                 -----
            459)1308(2 qrs.
                 918
                 ----
                 390
```

```
                        (74)
  yds. q.na.             £.   s.   d.   yd.
   54  1 2 390/459  :   20   16  4½ : : 1¼
    4                   20                4
  -----                ----             ----
   217                 416                4
     4                  12                4
  -----                ----             ----
   870                4996               20
   459                   4              459
  -----                ----             ----
   7830              19986             9180
  4350                9180
 3480                -------
 ----------          1598880
  399330             19986
     390           179874
  --------         ------------ 4)
  399720          )183471480(459
                   1598880   -----
                   ----------12)114 ¾qrs.
                   .2358348   -----
                    1998600  s. 9 6¾ Anſ.
                   ---------     -----
                   .3597480
                    3597480
                   ---------
```

(75)

(75)



In the above figure *a c*=3 feet 2 inches the length of the cane; *a b*=6 feet 3 inches length of its ſhadow. Alſo B C=the height of the ſteeple, and A B=144 yards 2 feet 2 inches the length of its ſhadow.

f. *in.* *f.* *in.* *yds.* *f.* *in.*
6 3 : 3 2 :: 144 2 2
12 12 3
75 38 434
12
5210
38
41680
15630
12)
75)197980(2639
150 3)219 11 inches
·479
450 *yds.* 73 0 $11\frac{55}{75}$ Anſ.
· 298
225
·730
675
·55

(76)

yds. *f.* *inch.* *yds.* *f.* *in.* *f.* *in.*
73 0 $11\frac{55}{75}$: 144 2 2 :: 3 2
3 3 12
209 434 38
12 12 75
2639 5210 190
75 2850 266
13250 260500 2850
18473 41680
197980 10420 *inch.*
197980)14848500(75=6 ft. 3 inch. Anſ.
1385860
··989900
989900

(77)

ſecond : *feet* * :: *ſeconds.*

1 : 1142 :: $8\frac{1}{2}$

2   17   2

---

2)19414   17

Anſ. 9707 feet.

(78)

feet. : *ſec.* :: *feet*

9707 : $8\frac{1}{2}$ :: 1142

2   17 half ſec.

17   9707)19414(2=1 ſec.

19414

(79)

ſec. : *feet.* :: *ſec.*

1 : 1142 :: 5

5

f.   *mile feet*

1 mile=5280)5710(1   430 Anſ.

5280

..430

(80)

feet : *ſec.* :: *feet*

5710 : 5 :: 1142

5

5710)5710(1*ſec.* Anſ.

5710

* Sound, by experiment, is found to fly 1142 feet in one ſecond of time.

```
(81)  £.      £.  s.       £.  s.
      100  :  4   10  ::   96  4
       20     20           20
     ----    ---          ----
     2000     90          1924
                            90
                          ----- 2|0)
               2|000)173|160(8|6
                      16     ----
                     ---
                     .13  £.4 6 6¾ 1680/2000 Ans.
                      12
                     -----
                     .1160
                        12
                     -----
               2|000)13|920(6d.
                      12
                     ---
                     .1920
                         4
                    ------
               2|000)7|680(3 qrs.
                      6
                    -----
                     1680

(82)  £. s. d.                £.  s.     £.  s.
      4  6  6¾ 1680/2000  :   96  4  ::  4   10
        20                    20         20
       ---                   ----       ---
        86                   1924        90
        12                               12
       ----                             ----
      1038                              1080
         4                                 4
      ----                              ----
      4155                              4320
      2000                              2000
    -------                          -------
    8311680                          8640000
                                        1924
                                    --------
                                    34560000
                                   17280000
                                  77760000
                                 8640000
                                 ------------ 2|0)
                        8311680)16623360000(200|0
                                16623360    -----
                                ---------- £.100 Ans.
                                     000
```

£. s. (83)
Principal 100 0
Interest 4 10
£. s. £. s.
104 10 : 4 10 :: 146 10
20 20 20
2090 90 2930
90
2|0)
2090)263700(12|6
2090
5470 £.6 6 $2\frac{140}{2090}$ Anſ.
4180
12900
12540
360
12
2090)4320(2d.
4180
140

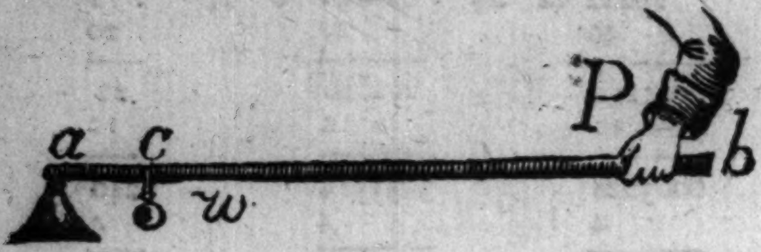
(84) £. s. d. £. s. £. s.
6 6 $2\frac{14}{209}$: 146 10 :: 4 10
20 20 20
126 2930 90
12 12
1514 1080
209 209
13640 9720
30280 21600
316440 225720
2930
6771600
2031480
451440
2|0)
316440)661359600(209|0
632880
2847960 £.104 10
2847960
0

```
(85)     £.     s.   d.        £.     s.  d.        £.
       25262   12   4½  :    12631    6   2¼  : :    1
          20                    20                  20
       --------             ---------             ------
      505252                252626                  20
          12                    12                  12
      --------             ---------             ------
     6063028               3031514                 240
           4                     4                   4
     --------              ---------             ------
    24252114              12126057                 960
                               960
                          ---------
                         727563420
                        109134513
                       ------------4)
          24252114)116410014720(480
                    97008456   ---
                   ---------  12)120
                  :194016912   ---
                   194016912   10s. Ans.
                   ---------   ---
                           0

(86)     s.      £.          £.   s. d.
         10  :   1   : :   12631  6  2¼
         12     20            20
        ----   ----       --------
        120     20         252626
          4     12             12
        ----   ----       --------
        480    240        3031514
                 4              4
               ----       --------
               960       12126057
                              960
                     ------------
                        727563420
                      109134513
                     ------------
           { 8)1164101472|0
      48|0 {   ------------
           { 6) 145512684
                -----------
              4)24252114
                ---------
             12)6063028—½qrs.
                --------
            2|0)50525|2—4d.
                --------
              £.25262 12 4½ Ans.
```

(87)

(87)



l. lb. l. l.
12½ : 186 :: 127½ * 140
2 2 12½
25 255 127½ longeſt end
186
1530
2040
155
25 { 5)47430
5) 9486—0
1897—1 } 5=⅕
Anſ 1897 ⅕lb. the weight required.

---

* Leavers of the ſecond order, are ſuch where the power acts at one end, the prop fixed directly at the other, and the weight ſome where between them.

(88)

(88)

lb. : *in.* :: *lb.*
$1897\frac{1}{5}$: $127\frac{1}{2}$ :: 186
5 2 5
9486 255 930
930
7650
2295
2)
9486)237150(25
18972
.47430 $12\frac{1}{2}$ Anſ.
47430

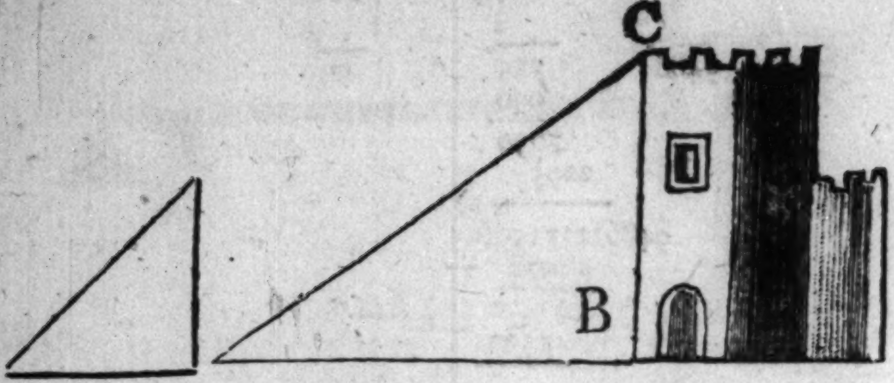
(89)

E. *d.* *E.* *£.* *s.* *d.*
3 : 1 :: 864 2 6 4 what ſold for
1 1 4 0 what coſt at 3 a penny
3)864 1 2 4
20
12)288
22
2|0)2|4 12
£. 1 4 268
2
Anſ.536 at two a penny

(90)

E. *d.* *E.* *£.* *s.* *d.*
2 : 1 :: 536 2 6 4 what ſold for
1 1 2 4 what coſt at 2 a penny
2)536 1 4 0
20
12)268
2|0)2|2 4*d.* 24
12
£.1 2 4
288
3
Anſ.864 at 3 a penny

(91)



```
  F.  I.     F.  I.          F.  I.
  98  6  :   50  11   : :   581  7
  12         12              12
 ----       ----           ------
 1182        611            6979
                             611
                           ------
                            6979
                           6979
                         41874
                       ---------  ----  12)
             1182)4264169(3607
                   3546           --------
                  ------          f.300  7 695/1182  Anſ.
                   .7181
                    7092
                   ------
                   ..8969
                     8274
                    ------
                     .695
```

(92)

(92)

f.	*in.*		*f.*	*in.*		*f.*	*in.*
300	$7\frac{695}{1182}$	:	581	7	::	50	11
12			12			12	

3607 6979 611

1182 1182

7909 1222

28856 4888

3607 611

3607 611

4264169 722202

6979

6499818

5055414

6499818

4333212

12)

4264169)5040247758(1182

4264169

*f.*98 6 Anſ.

7760787

4264169

34966185

34113352

8528338

8528338

(93)

(93)

```
hour min.   miles       hour
 23  56  :  15540  ::  1=60 minutes
 60            60
----       ------
1436  1436)932400(649 109/359 miles Anſ.
           8616
           ----
           .7080
            5744
            ----
            13360
            12924
            -----
            ..436
```

(94)

```
  miles.            hour        miles
 649 109/359   :     1    ::    15540
 359                              359
 ---                           ------
 5950                          139860
3245                           77700
1947                          46620
------                        ------- ho. mi.
233100                 233100)5578860(23  56 Anſ.
                              466200
                              -------
                              .916860
                               699300
                              -------
                               217560
                                   60
                              -------
                       233100)13053600(56 min.
                              1165500
                              -------
                             .1398600
                              1398600
                              -------
```

(95)

(95) ′ ″ *digits* ′ ″
33 28 : 12 : : 29 28
60 60
2008 1768
12 *dig.* ′ ″
2008)21216(10 33 56 $\frac{164}{251}$ Anſ.
2008
.1136
60
2008)68160(33
6024
.7920
6024
.1896
60
2008)113760(56
10040
.13360
12048
.1312

(96) *dig.* ′ ″ ′ ″ *dig.*
10 33 56 $\frac{164}{251}$ · 29 28 : : 12
60 60 60
633 1768 720
60 60
38036 43200
251 251
38036 432
190180 2160
76072 864
9547036 10843200
164 1768
95472|00 867456
650592
759024
108432
6|0)
95472)191707776|00(200|8
190944
...763776 33′ 28″ A
763776

(97)

£. s.
3)2290 10

£. s. d. C.
1 3 3 : 1 :: 763 10 = $\frac{1}{3}$
20 20

23 15270
12 12

279 279)183240(656 $\frac{216}{279}$ *cwt.*
1674
.1584
1395
.1890
1674
.216

£. s.
2290 10
763 10

£. s. C.
43 16 : 1 :: 1527 0
20 20

876 876)30540(34 $\frac{756}{876}$ *tuns*
2628
.4260
3504
.756

(98)

(98)

£. s.

C. 3)2290 10 C.

1st. $656\frac{216}{279}$: 763 10 :: 1

279 20 279

5910 15270 279

4593 279

1314

183240 137430

106890

30540

2|0)

18324|0)42603|0 (2|3

36648

£. 1 3 3 per cwt.

59553

54972

4581

12

18324)54972 (3d.

54972

£. s.

2290 10

763 10

Tuns. *Tun.*

2d. $34\frac{756}{876}$: 1527 0 :: 1

876 876

210 9162

243 10689

279 12216

£. s.

30540) 1337652(42 16 per tun.

122160

116052

91620

24432

20

30540)488640(16*s.*

30540

183240

183240

(99)

Hound. Hare. Hound. Hare.
Firſt as 4 : 6 :: 120 : 180 paces.
Second as 4 : 6 :: 12 : 18 ditto.
And 18 hares paces — 16 ditto = 2 gain.

Hare. Hound. Hare.
Third as 2 : 12 :: 180
180
2)2160
Anſ. 1080 paces.

(100)

Hound p. Hare p. Hound p.
Firſt as 12 : 16 :: 4 and 6
4 $5\frac{1}{3}$
12)64 Hares p. $\frac{2}{3}$ loſs.
$5\frac{1}{3}$ Hares paces.

Hare. Hound. Hare.
Second as 6 : 4 :: $\frac{2}{3}$
3 2
18 8
$\frac{8}{18}=\frac{4}{9}$ Hounds paces.

Hound. Hound. Hound.
Thirdly as 4 : $\frac{4}{9}$ :: 1080
9 4
36 6)4320
36 { 6) 720
Anſ. 120 Hounds p. before.

THE RULE OF THREE INVERSE.

ANSWERS.

(1) *M.* *D.* *M.*
3 : 6 :: 6
3
6)18
3 days anſ.

(2) *D.* *M.* *D.*
3 : 6 :: 6
3
6)18
3 Men anſ.

(3)
M. *D.* *M.*
18 : 30 :: 24
18
24 { 4)540
6)135—0 }
22—3 } 12 = $\frac{1}{2}$.
Anſ. 22$\frac{1}{2}$ Days.

(4) *D.* *M.* *D.*
22$\frac{1}{2}$: 24 :: 30
2 45 2
45 120 60
96
6|0)108|0
Anſ. 18 Men.

(5) *I. b.* *I. l.* *I. b.*
12 : 12 :: 5
12
5)144
28$\frac{4}{5}$ In. long anſ.

```
     I. b.    I. l.    I. l.
(6)  28⅘  :  5  ::  12
      5               5
     ———            ———
     144             60
      5
     ———
  6|0)72|0
     ———
      12 In. broad the anſ.
     ———
```

```
       £.     D.       £.
(7)   90  :  540  ::  162.
              90
             ———
     162)48600(300 Days anſ.
         486
         ————
           00
```

```
      D.     £.       D.
(8)  300  :  162  ::  540
             300
            ————
     540)48600(90 £. anſ.
         4860
         ————
            0
```

```
      s.    oz.  dwt.    s.  d.
(9)   5  :  11    8  ::  9   6
     12     20           12
     ——     ——           ——
     60    228           114
     ——     60    2|0)   ——
   114)13680 ( 12|0
       114      ————
       ———       6 oz. anſ.
       . 228
         228
         ———
           0
```

```
      oz.    s.  d.      oz.  dwt.
10)   6  :   9   6   ::  11    8
     20     12           20
     ——     ——           ——
    120    114           228
           120           ———
           ——— 12)
  228)13680(60
      1368   —
      ——— —   5s. anſ.
         0
```

```
      Mo.  Soldiers    Mo.
(11)   8  :  7200  ::  6
               8
             ————
          6)57600
             ————
             9600
             7200
             ————
     Anſ.    2400 S. to be added
             ————
```

(12)

Men. *Mo.* *Men.*
(12) 9600 : 6 :: 7200
6
7200)57600(8 months anſ.
57600

W. *H.* *W.*
(13) 18 : 48 :: 8
18
8)864
108 horſes anſ.

H. *W.* *H.*
(14) 108 : 8 :: 48
8
48 { 8)864
6)108
18 weeks the anſ.

D. *M.* *D.*
(15) 14 : 68 :: 4
14
4)952
238 maſons anſ.

M. *D.* *M.*
(16) 238 : 4 :: 68
4
68)952(14 days anſ.
68
272
272

F. *I.* *F.* *I.*
(17) 7 3 : 69 :: 27
12
87
69
783
522
27 { 3)6003
9)2001—0 }
3)222—3 } $\frac{9}{27}$=4in.
yds. 74 0 4 anſ.

(18)
yds. f. in. in. f.
74 0 4 : 27 :: 69
3 12
222 828
12
2668
3×9=27
8004
9
828)72036(87 inches anſ.
6624
5796
5796

(19)
qrs. yds. qrs.
5 : 550 :: 3
5
3)2750
$916\frac{2}{3}$ yds. anſ.

(20)
yds. qrs. yds.
$916\frac{2}{3}$: 3 :: 550
3 3
2750 1650
3
1650)8250(5 qrs. wide anſ.
8250

(21)
£. yrs. £.
160 : 30 :: 1200
30
12|00)48|00
4 yrs. anſ.

(22)
yrs. £. yrs.
4 : 1200 :: 30
4
3|0)480|0
£. 160 anſ.

(23)
Men. W. D. M.
20 : 87 3 :: 12
7
612
20
12)12240
7)1020
W. 145 days 5 anſ.

(24)
W. D. Men W. D.
145 5 : 12 :: 87 3
7 7
1020 612
12
612)12240(20 men anſ.
1224
0

(25)

p. b. *p. l.* *p. b.*
(25) 8 : 20 :: 3
8
3)160
Anſ. 53$\frac{1}{3}$ pearch. long

p. l. *p. b.* *p l.*
(26) 53$\frac{1}{3}$: 3 :: 20
3 3
160 60
3
6|0)48|0
Anſ. 8 pearches broad.

Sh. *D.* *Sh.*
(27) 200 : 80 :: 800
200
8|00)160|00
Anſ. 20 days.

D. *Sh.* *D.*
(28) 20 : 800 :: 80
20
8|0)1600|0
Anſ. 200 ſheep.

Cattle. *W.* *Cattle.*
(29) 45 : 4 :: 30
4
3|0)18|0
6 weeks anſ.

W. *C.* *W.*
(30) 6 : 30 :: 4
6
4)180
45 cattle anſ.

F. *I.* *F.* *F.* *I.*
(31) 16 3 : 18 :: 2 6
12 12
195 30
18
3|0)351|0
3)117
39 yds. anſ.

Yds. *F.* *I.* *Feet.*
(32) 39 : 2 6 :: 18
3 12
117 30
30
18 { 3)3510
6)1170
12)195
Feet 16 3 inches anſ.

(33)

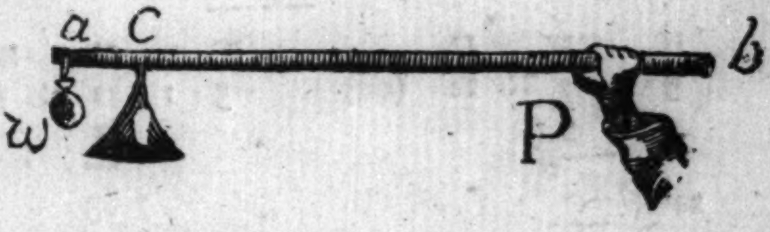
(33) *Miles.* *C.* *Q.* *lb.* *Miles.*
80 : 15 2 8 :: 60
4
62
4×7=28
248
7
1744
80
60|)13952|0
28 { 4)2325 $\frac{2}{6}=\frac{1}{3}$ *lb.*
7)581 1 }
4)83 0 } =1 *lb.*
C. 20 3 $1\frac{1}{3}$ anſ.

(34) *C.* *Q.* *lb.* *M.* *C.* *Q.* *lb.*
20 3 $1\frac{1}{3}$: 60 :: 15 2 8
4 4
83 64
4×7=28 4×7=28
332 248
7 7
2325 1744
3 3
6976 5232
60
5232)418560(80 miles anſ.
41856
0

(35)

H. *Cock* *Minutes*
(35) 3 : 1 :: $7\frac{1}{2}$
60 2
180 15
2
15 { 3)360
5)120
24 cocks anſ.

Cocks. *Min.* *Cock.*
(36) 24 : $7\frac{1}{2}$ :: 1
2
15
12×2=24
180
2
2)360
6|0)18|0
Anſ. 3 hours.



In the above Figure *a b*=120 inches, *a C*=8, *P* the power, or $1\frac{3}{4}$ cwt. and *w* the weight.

Inches.
(37) 120
− 8
lb. *inches*
112 : 196 :: 8
112
392
196
196
8)21952
2744 lb. anſ.

lb. *I.* *lb.*
(38) 2744 : 8 :: 196
8
196)21952(112 long. end
196 + 8 ſhort.end
235 120 in. anſ.
196
392
392

(39)

F. I. *F. I.* *F. I.*
(39) 5 2 : 9 6 :: 3 4
12 12 12
62 114 40
62
228
684
4|0)70618
12)176 $\frac{28}{40}=\frac{7}{10}$
Feet 14 8 $\frac{7}{10}$ anſ.

F. *I.* *F. I.* *F. I.*
(40) 14 8$\frac{7}{10}$: 3 4 :: 9 6
12 12 12
176 40 114
10 10
1767 1140
40
12)
1140)70680(62
6840 5 *F.* 2 *In.* anſ.
2280
2280

H. *W.* *H.*
(41) 9 : 7 :: 21
9
21 { 7)63
3)9
Anſ. 3 weeks

W. *H.* *W.*
(42) 3 : 21 :: 7
3
7)63
Anſ. 9 horſes

* Or by direct Proportion thus.

H. *W.* *H.*
21 : 7 :: 9
9
21 { 7)63
3)9
Anſ. 3 weeks

W. *H.* *W.*
7 : 21 :: 3
3
7)63
Anſ. 9 horſes

---

* Any queſtion in the Rule of Three Inverſe, may be ſtated ſo as to have its terms in direct proportion by changing the places of the firſt and third terms in the queſtion, as in the above example.

COM-

COMPOUND PROPORTION.

ANSWERS.

(1)

B. *H.* *B.*

⊕ 9——16——24

6 *d.*————8 *d.* ⊕

9	24
8	16
72	384
	6

$72\begin{cases}9)2304\\8)256\end{cases}$

32 horſes anſ.

By two ſtatings.

9 : 16 :: 24

16

9)384

$42\frac{6}{9}$

6 : $42\frac{6}{9}$ :: 8

9

384

6

8)2304

9)288

32 horſes anſ.

(2)

H. *B.* *H.*

⊕ 32——24——16

⊕ 8 *d.*————6 *d.*

256

96

3×8=24

288

8

256)2304(9 buſhels anſ.

2304

By two ſtatings.

H. B. H.
32 : 24 : : 16
16
32 { 4)384
8)96
12 buſhels

8 : 12 : : 6
6
8)72
9 buſhels anſ.

(3)

Sol. £. Sol.
⊕ 40 — 24 — 1500
⊕ 36 days — 32 days
1440

3000
4500
48000
24
192000
96000
£.
144|0)115200|0(800 anſ.
1152
0 0

By two ſtatings.

Sol. £. Sol.
40 : 24 : : 1500
1500
4|0)3600|0
£. 900

D. £. D.
36 : 900 : : 32
32
1800
2700
36 { 6)28800
6)4800
£. 800 anſ.

(4) £. *Men* £.

◆ 800 —— 1500 —— 24

◆ 36 *days* 32 *days*

28800

48

72

768

1500

288|00) 11520|00 (40 men anſ.

1152

0

By two ſtatings.

£. M. £.

800 : 1500 : : 24

1500

8|00) 360|00

45 men

D. M. D.

36 : 45 : : 32

4 × 8 = 32

180

8

36 { 6) 1440

6) 240

40 men anſ.

(5) *Deals* *f. l.* *f. l.*

9000 —— 14 —— 12 ◆

2½ *in. th.* —— 1½ ◆ *in. thick.*

2½ 9000 1½

2 14 2

5 126000 3

5 12

36 { 6) 630000 36

6) 105000

17500 deals anſ.

By two ſtatings.

Deals	*f. l.*	*f. l.*
9000 :	14 ::	12
14		
12)126000		
10500 deals		

in. thick	*deals.*	*in. thick*
2½ :	10500 ::	1½
2	5	2
5	3)52500	3
	17500 deals anſ.	

(6)

D. *f. l.* *f. l.*

17500——12——14 ×

1½ *in.tb.* —— 2½ × *in. thick*

in.	*Deals*	*in.*
1½	175000	2½
2	3	2
3	52500	5
	12	14
	7|0)63000|0	70 diviſor
	9000 deals anſ.	

By two ſtatings.

D.	*f. l.*	*f. l.*
17500 :	12 ::	14
12		
14 { 7)210000		
2) 30000		
15000 deals		

in. th.	*D.*	*in. thick*
1½ :	15000 ::	2½
2	3	2
3	5)45000	5
	9000 deals anſ.	

(7)

Men *oz.* *Men*
12000——15——10000 ×
32 weeks —— 48 × weeks

384000 480000
15

48|0000 { 6)576|0000
8) 96

12 oz. anſ.

By two ſtatings.

Men. *oz.* *Men* *W.* *oz.* *W.*
12000 : 15 :: 10000 32 : 18 :: 48
15 32

1|0000)18|0000 48 { 6)576
8)96

18 *oz.* 12 oz. anſ.

(8)

M. *oz.* *M.*
10000——12——12000 ×
48 weeks—— 32 × weeks

480000 384000
12

384|000)5760|000(15 oz. anſ.
384

1920
1920

By two ſtatings.

M. oz. M. W. oz. W.
10000 : 12 : : 12000 48 : 10 : : 32
12 10
12|000)120|000 32 { 4)480
10 oz. 8)120
15 oz. anſ.

(9)

M. £. M.
◆ 27——36——72
◆ 24 weeks ——— 48 weeks
108 576
54 288
648 3456
36
20736
10368
648)124416(192*l.* anſ.
648
5961
5832
1296
1296

By two ſtatings.

M. £. M. W. £. W.
27 : 36 : : 72 24 : 96 : : 48
72 48
72 768
252 384
27 { 9)2592 24 { 6)4608
3)288 4)768
£. 96 £. 192 anſ.

(10)

(10) *Stud.* £. *Stud.*

72——192——27

48 *weeks* ——— 24 *weeks*

576

288

3456

108

54

648

192

1296

5832

648

£.

3456)124416(36 anſ.

10368

20736

20736

By two ſtatings.

Stud. £. *Stud.*

72 : 192 : : 27

27

1344

384

72 { 8)5184

9)648

£. 72

weeks £. *weeks*

48 : 72 : : 24

24

288

144

48 { 8)1728

6)216

£. 36 anſ.

(11)

£. — £. — £.
100 — 5 — 144
365 *days* — 486 *days*
36500 — 864
1152
576
69984
5
£. *s.* *d.*
36500)349920(9 11 $8\frac{3}{4}$ $\frac{137}{365}$ anſ.
328500
. 21420
20
36500)428400(11 *s.*
36500
. 63400
36500
26900
12
36500)322800(8 *d.*
292000
. 30800
4
36500)123200($\frac{3}{4}$ *qrs.*
109500
. 13700

By two ſtatings.

£. £. £.
100 : 5 :: 144
5
£. *s.*
100)720(7 4
700
. 20
20
100)400(4 *s.*
400

D. £. *s.* *days*
365 : 7 4 :: 486
20 $12 \times 12 = 144$
144 5832
12
s.
356)69984 (191 $\frac{634}{365}$ =
(9*l.* 11*s.* $8\frac{3}{4}$*d.* $\frac{137}{365}$ anſ.

(12)

```
(12)         £.       £.   s.  d.              £.
  ⊕         144 ——— 9   11  8¾ 137/365 ——— 100
  ⊕         486 days    ————         ————  365 days
            ———                            —————
            864                            36500
           1152                            —————
           576          9   11  8¾ 137/365
        ————            20
         69984        ————
                        191
                         12
                      ————
                       2300
                          4
                      ————
                       9203
                        365
                     ——————
                      46015
                     55218
                    27609
                   ———————
                    3359095
                     + 137
                   ———————
                    3359232
                      36500
                  ——————————
                  16796160
                 20155392
                10077696
                ——————————            (365)   (4)
     69984)122611968000(1752000(4800
           69984                1460     ————
           —————                ————  12)1200
           526279               . 2920   ————
           489888                 2920 2|0)10|0
           ————— —              ————     ————
           . 363916                 00 £.5 anſ.
             349920                      ——
            ———————
            . 139968
              139968
            ——————————
                   000
```

By

By two ſtatings.

£. £. *s.* *d.* £.
144 : 9 11 $8\frac{3}{4}\frac{137}{365}$ :: 100
20
191
12
2300
4
9203
365
46015
55218
27609
3359095
+137
3359232
100
144 { 12)335923200
12)27993600
qrs. £. *s.* *d.*
365)2332800(6391=6 13 $1\frac{3}{4}\frac{85}{365}$

Days £. *s.* *d.* *days*
486 : 6 13 $1\frac{3}{4}\frac{85}{365}$ :: 365
20
133
12
1597
4
6391
365
31955
38346
19173
2332715
+85
2332800
365
11664000
13996800
6998400
(365) (4) *d.* £.
486)851472000 (1752000 (4800(1200=5 anſ.

(13)

(13) *D.* *D.* *D.*

◆ 6——12——4

◆ 8 perſ.————40 perſons

48 160

12

48 { 6)1920

8)320 }

40*d.* anſ.

By two ſtatings.

D. *D.* *D.* *P.* *D.* *P.*

6 : 12 :: 4 8 : 8 :: 40

4 8

6)48 8)320

8 40 *d.* anſ.

(14) *M.* *£.* *M.*

12——100——8

◆ 5*l.* ———— 10*l.*

8 100

40 10

1000

12

4|0)1200|0

£. 300 principal, the anſ.

(15) *M.* *£.* *M.*

8——300——12 ◆

◆ 10*l.* ——— 5*l.*

10 300

12 5

12|0 1500

8

12|0)12000

£. 100 principal, the anſ.

(16)

```
             Men.          days          Men.
             248   ——————   5   ——————   24     ◆
            11 h.  ————————     ——————   9 h.   ◆
            7 deg. —————————————————     4 deg. ◆
◆         232 long ——————   ——————     337 long
◆          4 wide  ——————   ——————       5 wide
◆          3 deep  ——————   ——————       4 deep

             232                   248
               4                    11
            ————                  ————
             928                  2728
               3                     7
            ————                 —————
            2784                 19096
              24                     5
          ——————                ——————
           11136                 95480
           5568                    337
          ——————               ———————
           66816                668360
               9               286440
          ——————              286440
          701344             —————————
               4              32176760
         ———————                     5
         2805376            ——————————
                             160883800
                                     4
                            ——————————
                2805376)643535200(229⅓ days anſ.
                        5610752
                        ———————
                         8246000
                         5610752
                         ———————
                         26352480
                         25248384
                         ————————
                          1104096
```

(17)

```
(17)      C.            D.            C.
          4     ———     16    ———    ~~9~~ ◆ 3
 4     ~~12~~ h.  ———          ———    10 ◆ h.
     ◆   14 ſ.  ———        ————————   30 ſ.
     ◆   24 p.  ———          ———      16 p.
     ◆   44 l.  —————        ———     ~~50~~ l.  - 5
 4   ◆  ~~40~~ l.  ———          ———      45 l.

               9            16
              10             4
             ———           ———
              90            64
              14            12
             ———           ———
            1260           768
              24            30
             ———        ——————
            5040         23040
            2520            16
         ———————        ——————
           30240        368640
              44            50
         ———————       ———————
          120960      18432000
         120960             45
         ———————     —————————
         1330560      92160000
              40     73728000
         ———————     —————————
      532224|00) 8294400|00(15 45/77 days anſ.
                 532224
                 ——————————
                  2972160
                  2661120
                 ————————
                 . 311040
```

This Rule may be proved by multiplying the quotient and all the diviſors together, whoſe product will be equal to the product of all the other numbers if the work be right.

PRACTICE.

ANSWERS.

(1)

4 | 1644 at $\frac{1}{4}$d.

12 | 411

2|0 | 31|4 3d.

£. | 1 14 3 anſ.

By Proportion.

yd. d. yds.

1 : 0$\frac{1}{4}$ :: 1644

1

4)1644

12)411

2|0)31|4 3d.

£. 1 14 3 anſ.

(2)

2 | 2446 at $\frac{1}{2}$d.

12 | 1223

2|0 | 10|1 11d.

£. | 5 1 11 anſ.

By Proportion.

1 : 0$\frac{1}{2}$ :: 2446

2

4)4892

12)1223

2|0) 10|1 11d.

£. 5 1 11 anſ.

(3)

d.

$\frac{1}{2} = \frac{1}{2}$ | 1426 at $\frac{3}{4}$d.

$\frac{1}{4} = \frac{1}{2}$ | 713

356 6d.

12 | 1069 6

2|0 | 8|9 1$\frac{1}{2}$

£. | 4 9 1$\frac{1}{2}$

By Proportion.

1 : 0$\frac{3}{4}$ :: 1426

3

4)4278

12)1069 $\frac{1}{2}$

2|0)8|9 1d.

£. 4 9 1$\frac{1}{2}$

(4)

(4)

12 | 1436 at 1*d.*
2|0 | 11|9 8*d.*
£. | 5 19 8 anſ.

By Proportion.

1 : 1 :: 1436
1
12)1436
2|0)11|9 8*d.*
£. 5 19 8 anſ.

d. (5)

$1\frac{1}{2} = \frac{1}{8}$ | 3224 at $1\frac{1}{2}$*d.*
2|0 | 40|3
£. | 20 3 0 anſ.

By Proportion.

1 : $1\frac{1}{2}$ :: 3224
2 3
3
2)9672
12)4836
2|0)40|3
£. 20 3 0 anſ.

d. (6)

$2 = \frac{1}{6}$ | 3640 at 2*d.*
2|0 | 60|6 8*d.*
£. | 30 6 8*d.*

By Proportion.

1 : 2 :: 3640
2
12)7280
2|0)60|6 8*d.*
£. 30 6 8*d.* anſ.

What remains after dividing by any number, is always of the ſame name with the dividend.

d. (7)
$3 = \frac{1}{4}$ | 642 at 3*d.*
2|0 | 16|0 6*d.*
£. | 8 0 6 anſ.

By Proportion.
1 : 3 :: 642
3
12)1926
2|0)16|0 6*d.*
£. 8 0 6 anſ.

d. (8)
$4 = \frac{1}{3}$ | 3641 at 4*d.*
2|0 | 121|3 8*d.*
£. | 60 13 8 anſ.

By Proportion.
1 : 4 :: 3641
4
12)14564
2|0)121|3 8*d.*
£. 60 13 8*d.*

d. (9)
$6 = \frac{1}{2}$ | 341 at 6*d.*
2|0 | 17|0 6*d.*
£. | 8 10 6 anſ.

By Proportion.
1 : 6 :: 341
6
12)2046
2|0)17|0 6*d.*
£. 8 10 6 anſ.

s. d. (10)
1 8 $= \frac{1}{12}$ | 346 at 1*s.* 8*d.*
£. | 28 16 8 anſ.

By Proportion.
1 : 1 8 :: 346
12 20
20 12)6920
2|0)57|6 8
£. 28 16 8*d.* anſ.

(11)

s. (11)
2 = $\frac{1}{10}$ | 842 at 2*s*. *
£. | 84 4 0 anſ.

By Proportion.
1 : 2 :: 842
2
2|0)168|4
£. 84 4 0 anſ.

s. *d*. (12)
2 6 = $\frac{1}{8}$ | 480 at 2*s*. 6*d*.
£. | 60 anſ.

By Proportion.
1 : 2 6 :: 480
12 30
30 12) 14400
2|0)120|0
£. 60 anſ.

s. *d*. (13)
3 4 = $\frac{1}{6}$ | 962 at 3*s*. 4*d*.
£. | 160 6 8 anſ.

By Proportion.
1 : 3 4 :: 962
12 40
40 12)38480
2|0)320|6 8
£. 160 6 8 anſ.

s. (14)
4 = $\frac{1}{5}$ | 4060 at 4*s*.
£. | 812 anſ.

By Proportion.
1 : 4 :: 4060
4
2|0)1624|0
£.812 anſ.

---

* When the price is 2*s*. you may double the unit figure for ſhillings, the reſt are pounds.

(15)

s.
5 = $\frac{1}{4}$ | 120 at 5*s.*
£. | 30 anſ.

By Proportion.
1 : 5 :: 120
5
2|0)60|0
£. 30 anſ.

(16)

s. *d.*
6 8 = $\frac{1}{3}$ | 904 at 6*s.* 8*d.*
£. | 301 6 8 anſ.

By Proportion.
1 : 6 8 :: 904
12 80
80 12)72320
2|0)602|6=8*d.*
£. 301 6 8 anſ.

(17)

s.
10 = $\frac{1}{2}$ | 4116 at 10*s.*
£. | 2058 anſ.

By Proportion.
1 : 10 4116
10
2|0)4116|0
£. 2058 anſ.

RULE II.

(18)

= $\frac{1}{12}$ | 2800 at 1$\frac{1}{4}$*d.*
$\frac{1}{4}$ = $\frac{1}{4}$ | 233 4*d.*
58 4*d.*
2|0 | 291|1 8
£. | 14 11 8 anſ.

By Proportion.
1 : 1$\frac{1}{4}$ :: 2800
4 5
5 4)14000
12)3500
2|0)291|1 8*d.*
£. 14 11 8*d.*

d. (19)
1½ = ⅛ | 34|2 at 1¾d.
¼ = ⅙ | 42 9
| 7 1½
2|0 | 41|9 10½
£. | 2 9 10½ anſ.

By Proportion.
1 : 1¾ :: 342
4 7
7 4)2394
12)598 ½
2|0)41|9 10
£. 2 9 10½ anſ.

d. (20)
2 = ⅙ | 94 at 2¼d.
¼ = ⅛ | 15 8
| 1 11½
s. | 17 7½ anſ.

By Proportion.
1 : 2¼ :: 94
4 9
9 4)846
12)211½
s. 17 7½ anſ.

d. (21)
2 = ⅙ | 34|2 at 2½d.
½ = ¼ | 57
| 14 3
2|0 | 71|1 3
£. | 3 11 3 anſ.

By Proportion.
1 : 2½ :: 342
2 5
5 2)1710
12)855
2|0)71|1 3
£. 3 11 3 anſ.

d. (22)
2 = ⅙ | 43|2 at 2¾d.
½ = ¼ | 72
¼ = ½ | 18
| 9
2|0 | 91|9
£. | 4 19 anſ.

By Proportion.
1 : 2¾ :: 432
4 11
11 4)4752
12)1188
2|0)91|9
£. 4 19 anſ.

d. (23)
$3 = \frac{1}{4}$ | 482 at $3\frac{1}{4}d.$
$\frac{1}{4} = \frac{1}{12}$ | 120 6
| 10 $0\frac{1}{2}$
2|0 | 13|0 $6\frac{1}{2}$
£. | 6 10 $6\frac{1}{2}$ anſ.

By Proportion.
1 : $3\frac{1}{4}$ :: 482
4 13
13 4)6266
12)1566 $\frac{1}{2}$
2|0)13|0 6
£. 6 10 $6\frac{1}{2}$ anſ.

d. (24)
$3 = \frac{1}{4}$ | 481 at $3\frac{1}{2}d.$
$\frac{1}{2} = \frac{1}{6}$ | 120 3d.
| 20 $0\frac{1}{2}$
2|0 | 14|0 $3\frac{1}{2}$
£. | 7 0 $3\frac{1}{2}$ anſ.

By Proportion.
1 : $3\frac{1}{2}$ :: 481
2 7
7 2)3367
12)1683 $\frac{1}{2}$
2|0)14|0 3d.
£. 7 0 $3\frac{1}{2}$ anſ.

d. (25)
$3 = \frac{1}{4}$ | 4120 at $3\frac{3}{4}d.$
$\frac{3}{4} = \frac{1}{4}$ | 1030
| 257 6
2|0 | 128|7 6
£. | 64 7 6 anſ.

By Proportion.
1 : $3\frac{3}{4}$ :: 4120
4 15
15 4)61800
12)15450
2|0)128|7 6d.
£. 64 7 6 anſ.

d. (26)
$3 = \frac{1}{4}$ | 640 at $4\frac{1}{4}d.$
$1 = \frac{1}{3}$ | 160
$\frac{1}{4} = \frac{1}{4}$ | 53 4
| 13 4
2|0 | 22|6 8
£. | 11 6 8 anſ.

By Proportion.
1 : $4\frac{1}{4}$ :: 640
4 17
17 4)10880
12)2720
2|0)22|6 8d.
£. 11 6 8 anſ.

(27)

d.
4 = $\frac{1}{3}$ | 423 at 4$\frac{1}{2}$*d.*
$\frac{1}{2}$ = $\frac{1}{8}$ | 141
| 17 7$\frac{1}{2}$
2|0 | 15|8 7$\frac{1}{2}$
£. | 7 18 7$\frac{1}{2}$ anſ.

By Proportion.

1 : 4$\frac{1}{2}$ :: 423
4 18
18 4)7614
12)1903 $\frac{1}{2}$
2|0)15|8 7
£. 7 18 7$\frac{1}{2}$ a.

(28)

d.
3 = $\frac{1}{4}$ | 246 at 4$\frac{3}{4}$*d.*
[illegible] 1 = $\frac{1}{3}$ | 61 6
[illegible] $\frac{1}{2}$ = $\frac{1}{2}$ | 20 6
$\frac{1}{4}$ = $\frac{1}{2}$ | 10 3
| 5 1$\frac{1}{2}$
2|0)91|7 4$\frac{1}{2}$
£. 4 17 4$\frac{1}{2}$ anſ.

By Proportion.

1 : 4$\frac{3}{4}$ :: 246
4 19
19 4)4674
12)1168 $\frac{1}{2}$
2|0)91|7 4
£. 4 17 7$\frac{1}{2}$ anſ.

(29)

d.
X 4 = $\frac{1}{3}$ | 1412 at 5*d.*
1 = $\frac{1}{4}$ | 470 8
| 117 8
2|0 | 58|8 4
£. | 29 8 4 anſ.

By Proportion.

1 : 5 :: 1412
5
12)7060
2|0)58|8 4*d.*
£. 29 8 4*d.* anſ.

(30)

d. (30)
4 = $\frac{1}{3}$ | 2160 at 5$\frac{1}{4}$*d.*
1 = $\frac{1}{4}$ | 720
$\frac{1}{4}$ = $\frac{1}{4}$ | 180
| 45
2|0 | 94|5
£. | 47 5 anſ.

By Proportion.
1 : 5$\frac{1}{4}$ :: 2160
4 3×7=21
21 6480
7
4)45360
12)11340
2|0)94|5
£.47 5 anſ.

d. (31)
4 = $\frac{1}{3}$ | 3240 at 5$\frac{1}{2}$*d.*
1 = $\frac{1}{4}$ | 1080
$\frac{1}{2}$ = $\frac{1}{2}$ | 270
| 135
2|0 | 148|5
£. | 74 5 anſ.

By Proportion.
1 : 5$\frac{1}{2}$ :: 3240
2 11
11 2)35640
12)17820
2|0)148|5
£. 74 5 anſ.

d. (32)
4 = $\frac{1}{3}$ | 2134 at 5$\frac{3}{4}$*d.*
1 = $\frac{1}{4}$ | 711 4
$\frac{1}{2}$ = $\frac{1}{2}$ | 177 10
$\frac{1}{4}$ = $\frac{1}{2}$ | 88 11
| 44 5$\frac{1}{2}$
2|0 | 102|2 6$\frac{1}{2}$
£. | 51 2 6$\frac{1}{2}$ anſ.

By Proportion.
1 : 5$\frac{3}{4}$ :: 2134
4 23
23 6402
4268
4)49082
12)12270 $\frac{1}{2}$
20)102|2 6
£. 51 2 6$\frac{1}{2}$ anſ.

(33)

(33)

d.

$4 = \frac{1}{3}$ | 1204 at $6\frac{1}{4}$d.

$2 = \frac{1}{2}$ | 401 4

$\frac{1}{4} = \frac{1}{8}$ | 200 8

25 1

2|0 | 62|7 1

£. | 31 7 1 anſ.

By Proportion.

$1 : 6\frac{1}{4} :: 1204$

4 $5\times5=25$

25 6020

5

4)30100

12)7525

2|0)62|7 1d.

£. 31 7 1 anſ.

(34)

d.

$6 = \frac{1}{2}$ | 496 at $6\frac{1}{2}$d.

$\frac{1}{2} = \frac{1}{12}$ | 248

20 8

2|0 | 26|8 8

£. | 13 8 8 anſ.

By Proportion.

$1 : 6\frac{1}{2} :: 496$

2 13

13 2)6448

12)3224

2|0)26|8 8

£. 13 8 8

(35)

d.

$6 = \frac{1}{2}$ | 984 at $6\frac{3}{4}$d.

$\frac{1}{2} = \frac{1}{12}$ | 492

$\frac{1}{4} = \frac{1}{2}$ | 41

20 6

2|0 | 551|3 6

£ | 27 13 6 anſ.

By Proportion.

$1 : 6\frac{3}{4} :: 984$

4 $3\times9=27$

27 2952

9

4)26568

12)6642

2|0)551|3 6

£. 27 13 6

d.	(36)	
6 = $\frac{1}{2}$	842 at 7*d.*	
1 = $\frac{1}{6}$	421	
	70	2
2|0	491|1	2
£.	24 11	2 anſ.

By Proportion.

1 : 7 :: 842
7
12)5894
2|0)491|1 2
£. 24 11 2 anſ.

d.	(37)	
6 = $\frac{1}{2}$	436 at 7$\frac{1}{4}$*d.*	
1 = $\frac{1}{6}$	218	
$\frac{1}{4}$ = $\frac{1}{4}$	36	4
	9	1
2|0	261|3	5
£.	13 3	5 anſ.

By Proportion.

1 : 7$\frac{1}{4}$ :: 436
4 29
29 3924
872
4)12644
12)3161
2|0)261|3 5*d.*
£. 13 3 5 anſ.

d.	(38)	
6 = $\frac{1}{2}$	4160 at 7$\frac{1}{2}$*d.*	
1 = $\frac{1}{6}$	2080	
$\frac{1}{2}$ = $\frac{1}{2}$	346	8
	173	4
2|0	2601|0	0
£.	130 0	0 anſ.

By Proportion.

1 : 7$\frac{1}{2}$ :: 4160
2 15
15 2)62400
12)31200
2|0)2601|0
£. 130 0 0 anſ.

6d = $\frac{1}{2}$	4160
1$\frac{d}{2}$ = $\frac{1}{4}$	2080
	520
20	2600
	130 - 0 - 0

(39)

d. (39)

6 = $\frac{1}{2}$ | 896 at 7$\frac{3}{4}$*d.*

1 = $\frac{1}{6}$ | 448

$\frac{1}{2}$ = $\frac{1}{2}$ | 74 8

$\frac{1}{4}$ = $\frac{1}{2}$ | 37 4

18 8

2|0 | 571|8 8

£. | 28 18 8 anſ.

By Proportion.

1 : 7$\frac{3}{4}$ :: 896

4 31

31 896

2688

4)27776

12)6944

2|0)571|8 8*d.*

£. 28 18 8*d.* anſ.

d. (40)

6 = $\frac{1}{2}$ | 4960 at 8*d.*

2 = $\frac{1}{3}$ | 2480

826 8

2|0 | 330|6 8

£. | 165 6 8 anſ.

By Proportion.

1 : 8 :: 4960

8

12)39680

2|0)330|6 8*d.*

£. 165 6 8*d.* anſ.

d. (41)

6 = $\frac{1}{2}$ | 960 at 8$\frac{1}{4}$*d.*

2 = $\frac{1}{3}$ | 480

$\frac{1}{4}$ = $\frac{1}{8}$ | 160

20

2|0 | 66|0

£. | 33 anſ.

By Proportion.

1 : 8$\frac{1}{4}$ :: 960

4 $3 \times 11 = 33$

33 2880

11

4)31680

12)7920

2|0)66|0

£. 33 anſ.

(42)

d. (42)

6 = ½ | 842 at 8½*d.*

2 = ⅓ | 421

½ = ¼ | 140 4*d.*

35 1

2|0 | 59|16 5

£. | 29 16 5 anſ.

By Proportion.

1 : 8½ :: 842

2 17

17 2)14314

12)7157

2|0)59|16 5

£ 29 16 5*d.* anſ

d. (43)

6 = ½ | 123 at 8¾*d.*

2 = ⅓ | 61 6

½ = ¼ | 20 6

¼ = ½ | 5 1½

2 6¾

2|0 | 8|19:8 ¼

£. | 4:9:8¼*d.* anſ.

By Proportion.

1 : 8¾ :: 123

4 7×5=35

35 861

5

4)4305

12)1076 ¼

2|0)8|19 8

£. 4 9 8¼ anſ.

d. (44)

6 = ½ | 842 at 9*d.*

3 = ½ | 421

210 6*d.*

2|0 | 63|11 6

£. | 31 11 6 anſ.

By Proportion.

1 : 9 :: 842

9

12)7578

2|0)63|11 6

£. 31 11 6 anſ.

(45

(45)

d.
$6 = \frac{1}{2}$ | 786 at $9\frac{1}{4}$d.
$3 = \frac{1}{2}$ | 393
$\frac{3}{4} = \frac{1}{12}$ | 196 6
16 $4\frac{1}{2}$d.
2|0 | 6015 $10\frac{1}{2}$d.
£. 30 5 $10\frac{1}{2}$d. anſ.

By Proportion.

1 : $9\frac{1}{4}$ :: 786
4 37
37 5502
2358
4)29082
12)7270 $\frac{1}{2}$d.
2|0)6015 10d.
£. 30 5 $10\frac{1}{2}$d anſ.

(46)

d.
$6 = \frac{1}{2}$ | 1212 at $9\frac{1}{2}$d.
$3 = \frac{1}{2}$ | 606
$\frac{1}{2} = \frac{1}{6}$ | 303
50 6d.
2|0 | 9519 6
£. 47 19 6 anſ.

By Proportion.

1 : $9\frac{1}{2}$ :: 1212
2 19
19 2)23028
12)11514
2|0)9519 6d.
£. 47 19 6 a.

(47)

d.
$6 = \frac{1}{2}$ | 644 at $9\frac{3}{4}$d.
$3 = \frac{1}{2}$ | 322
$\frac{3}{4} = \frac{1}{4}$ | 161
40 3
2|0 | 5213 3
£. 26 3 3 anſ.

By Proportion.

1 : $9\frac{3}{4}$ :: 644
4 39
39 5796
1932
4)25116
12)6279
2|0)5213 3d.
£. 26 3 3 anſ.

d. (48)

6 = ½ | 596 at 10*d.*
3 = ½ | 298
1 = ⅓ | 149
| 49 8*d.*
2|0 | 49|16 8*d.*
£. | 24 16 8 anſ.

By Proportion.

1 : 10 :: 596
10
12)5960
2|0)49|16 8*d.*
£. 24 16 8 anſ.

d. (49)

6 = ½ | 742 at 10¼*d.*
3 = ½ | 371
1 = ⅓ | 185 6*d.*
¼ = ¼ | 61 10*d.*
| 15 5½*d.*
2|0 | 63|13 9½*d.*
£. | 31 13 9½*d.* anſ.

By Proportion.

1 : 10¼ :: 742
4 41
41 742
2968
4)30422
12)7605 ½*d.*
2|0)63|13 9*d.*
£. 31 13 9½*d.* anſ.

d. (50)

6 = ½ | 412 at 10½*d.*
3 = ½ | 206
1 = ⅓ | 103
½ = ½ | 34 4*d.*
| 17 2
2|0 | 36|0 6
£. | 18 0 6 anſ.

or 6 = ½
4 = ⅓
½
8

6 = ½ | 412 at 10½
3 = ½ | 206
1½ = ½ | 103
| 51 . 6
| 360 - 6

By Proportion.

1 : 10½ :: 412
2 3×7=21
21 1236
7
2)8652
12)4326
2|0)36|0 6*d.*
£. 18 0 6 anſ.

6 = ½ | 596 at 10
4 = ⅓ | 298
| 149 .. 8
20 | 496 .. 8
| 24 - 16 - 8

(51)

d. (51)

6 = $\frac{1}{2}$ | 680 at 10$\frac{3}{4}$d.

3 = $\frac{1}{2}$ | 340
1 = $\frac{1}{3}$ | 170
$\frac{1}{2}$ = $\frac{1}{2}$ | 56 8d.
$\frac{1}{4}$ = $\frac{1}{2}$ | 28 4
| 14 2

2|0 | 60|9 2

£. | 30 9 2d. anſ.

6 = $\frac{1}{2}$
4 = $\frac{1}{3}$ | 680

By Proportion.

1 : 10$\frac{3}{4}$ :: 680
4 43
43 2040
2720
4)29240
12)7310
20)60|9 2d.
£. 30 9 2d. anſ.

6 = $\frac{1}{2}$
4 = $\frac{1}{3}$

1×4

d. (52)

6 = $\frac{1}{2}$ | 1234 at 11d.

3 = $\frac{1}{2}$ | 617
1$\frac{1}{2}$ = $\frac{1}{2}$ | 308 6
$\frac{1}{2}$ = $\frac{1}{3}$ | 154 3
| 51 5

2|0 | 113|1 2

£. | 56 11 2 anſ.

~~1234~~
6 = $\frac{1}{2}$
4 = $\frac{1}{3}$ | 1234
| 617
| 411-4
1 = $\frac{1}{4}$ | 102-10
| 1131-2

By Proportion.

1 : 11 :: 1234
11
12)13574
2|0)113|1 2d.
£. 56 11 2 anſ.

d. (53)

6 = $\frac{1}{2}$ | 3620 at 11$\frac{1}{4}$d.

3 = $\frac{1}{2}$ | 1810
1$\frac{1}{2}$ = $\frac{1}{2}$ | 905
$\frac{3}{4}$ = $\frac{1}{2}$ | 452 6d.
| 226 3

2|0 | 339|3 9

£. | 169 13 9 anſ.

By Proportion.

1 : 11$\frac{1}{4}$ :: 3620
4 9×5=45.
45 32580
5
4)162900
12)40725
2|0)339|3 9d.
£. 169 13 9d. anſ.

✓

(54)

d.

$6 = \frac{1}{2}$ | 684 at $11\frac{1}{2}d.$

$3 = \frac{1}{2}$ | 342

$1\frac{1}{2} = \frac{1}{2}$ | 171

$\frac{3}{4} = \frac{1}{2}$ | 85 6d.

$\frac{1}{4} = \frac{1}{3}$ | 42 9

| 14 3

2|0 | 651|5 6

£. | 32 15 6d. ans.

$6 = \frac{1}{2}$, $4 = \frac{1}{3}$, $1 = \frac{1}{4}$, $\frac{1}{2} = \frac{1}{2}$

342

228

57

28..6

655..6

By Proportion.

$1 : 11\frac{1}{2} :: 684$

2 | 23

23 | 2052

1368

2)15732

12)7866

2|0)651|5 6d.

£. 32 15 6 ans.

$8 = \frac{1}{3}$

$3 = \frac{1}{8}$

$3/4 = d. \frac{1}{4}$

(55)

| 962 at $11\frac{3}{4}d.$

$8 = \frac{1}{3}$ | 96 4s. the price 2s.*

$2 = \frac{1}{4}$ | 32 1 4

$1 = \frac{1}{2}$ | 8 0 4

$\frac{1}{2} = \frac{1}{2}$ | 4 0 2

$\frac{1}{4} = \frac{1}{2}$ | 2 0 1

| 1 0 $0\frac{1}{2}$

£. | 47 1 $11\frac{1}{2}$ ans.

$6 = \frac{1}{2}$, $4 = \frac{1}{3}$, $1 = \frac{1}{4}$, $\frac{1}{2} = \frac{1}{2}$, $\frac{1}{4} = \frac{1}{2}$

962

481

320-8

80-2

40-1

20-0 1/2

20)94|1 . 11 1/2

47-1-11 1/2

By Proportion.

$1 : 11\frac{3}{4} :: 962$

4 | 47

47 | 6734

3848

4)45214

12)11303 $\frac{1}{2}$

2|0)941|1 11

£. 47 1 $11\frac{1}{2}$ ans.

RULE III.

(56)

d.

$6 = \frac{1}{2}$ | 642 at 1s 7d.

$1 = \frac{1}{6}$ | 321

| 53 6d.

2|0 | 101|6 6

£. | 50 16 6 ans.

By Proportion.

1 : 1 7 :: 642

12 | 19

19 | 12)12198

2|0)101|6 6d.

£. 50 16 6 ans.

---

* In some cases it will be found more convenient to find the anſwer at 2s. as in note, page 147; and divide that ſum by its alliquot parts, as in example 55.

d. (57)
4 = $\frac{1}{3}$ | 1241 at 2s. 5d.
2
2482
1 = $\frac{1}{4}$ | 413 8d.
103 5
2|0 2991|9 1
£. 149 19 1 anſ.

By Proportion.
1 : 2 5 :: 1241
12 29
29 11169
2482
12)35989
2|0)2991|9 1d.
£. 149 19 1 anſ.

d. (58)
6 = $\frac{1}{2}$ | 486 at 3s. 8d.
3
1458
2 = $\frac{1}{3}$ | 243
81
2|0 178|2
£. 89 2 0 anſ.

By Proportion.
1 : 3 8 :: 486
12 4×11=44
44 1944
11
12)21384
2|0)178|2
£. 89 2 0 anſ.

✓

d. (59)
3 = $\frac{1}{4}$ | 642 at 4s. 3d.
4
2568
160 6d.
2|0 2721|8 6
£. 136 8 6 anſ.

By Proportion.
1 : 4 3 :: 642
12 51
51 642
3210
12)32742
2|0)2721|8 6d.
£. 136 8 6 anſ.

✓

d. (60)
6 = ½ | 543 at 5s. 11d.
5
2715
3 = ½ | 271 6
1½ = ½ | 135 9
½ = ⅓ | 67 10½
22 7½
2|0 | 3211|2 9
£. 160 12 9 anſ.

By Proportion.
1 : 5 11 :: 543
12 71
71 543
3801
12)38553
2|0)3211|2 9d.
£. 160 12 9 anſ.

d. (61)
6 = ½ | 48 at 6s. 10½d.
6
288
[illegible] 3 = ½ | 24
1 = ⅓ | 12) 16
[illegible] ½ = ½ | 4
2
2|0 | 331|0
£. 16 10 0 anſ.

By Proportion.
1 : 6 10½ :: 48
12
82
4
330
4×12=48
1320
12
4)15840
12)3960
2|0)331|0
£. 16 10 0 anſ.

(62)

d. (62)
6 = ½ | 412 at 7*s.* 7*d.*
7
2884
1 = ⅙ | 206
34 4*d.*
2|0 | 312|4 4
£. 156 4 4 anſ.

By Proportion.
1 : 7 7 :: 412
12 91
91 412
3708
12)37492
2|0)312|4 4*d.*
£. 156 4 4 anſ.

d. (63)
3 = ¼ | 141 at 8*s.* 3¼*d.*
8
1128
¼ = $\frac{1}{12}$ | 35 3*d.*
2 11¾*d.*
2|0 | 116|6 2¼*d.*
£. 58 6 2¼ anſ.

By Proportion.
1 : 8 3¼ :: 141
12 397
99 987
4 1269
423
397
4)55977
12)13994 ¼
2|0)116|6 2
£. 58 6 2¼ anſ

d. (64)
6 = ½ | 364 at 9*s.* 7½*d.*
9
3276
1 = ⅙ | 182
½ = ½ | 30 4*d.*
15 2
2|0 | 350|13 6
£. 175 3 6 anſ.

By Proportion.
1 : 9 7½ :: 364
12 462
115 728
4 2184
1456
462
4)168168
12)42042
2|0)350|13 6*d.*
£. 175 3 6 anſ.

(65)

d.	(65)	By Proportion.	
4 = $\frac{1}{3}$	891 at 10s. $5\frac{1}{4}$d.	1 : 10 $5\frac{1}{4}$ ::	891
	10	12	501
	8910	125	891
1 = $\frac{1}{4}$	297	4	4455
$\frac{1}{4}$ = $\frac{1}{4}$	74 3d.		
	18 $6\frac{3}{4}$	501	4)446391
2|0	92919 $9\frac{3}{4}$		12)111597 $\frac{3}{4}$
£.	464 19 $9\frac{3}{4}$ anſ.		2|0)92919 9
			£.464 19 $9\frac{3}{4}$

d.	(66)	By Proportion.	
6 = $\frac{1}{2}$	401 at 11s. $9\frac{1}{2}$d.	1 : 11 $9\frac{1}{2}$ ::	401
	11	12	566
	4411	141	2406
3 = $\frac{1}{2}$	200 6d.	4	2406
$\frac{1}{2}$ = $\frac{1}{6}$	100 3		2005
	16 $8\frac{1}{2}$	566	
			4)226966
2|0	47218 $5\frac{1}{2}$		
			12)56741 $\frac{1}{2}$
£.	236 8 $5\frac{1}{2}$ anſ.		
			2|0)47218 5d.
			£.236 8 $5\frac{1}{2}$ a.

d.	(67)	By Proportion.	
6 = $\frac{1}{2}$	481 at 12s. 8d.	1 : 12 8 ::	481
	12	12	152
	5772	152	962
2 = $\frac{1}{3}$	240 6d.		2405
	80 2		481
2|0	60912 8		12)73112
£.	394 12 8 anſ.		2|0)60912 8
			£. 394 12 8 anſ.

d.	(68)	By Proportion.
6 = ½	801 at 13*s*. 6*d*.	1 : 13 6 :: 801
	13	12 162
	10413	162 1602
	400 6*d*.	4806
		801
2|0	1081|3 6	12)129762
£.	540 13 6 anſ.	2|0)1081|3 6*d*.
		£. 540 13 6 anſ.

d.	(69)	By Proportion.
6 = ½	482 at 14*s*. 8*d*.	1 : 14 8 :: 482
	14	12 176
	6748	176 2892
2 = ⅓	241	3374
	80 4*d*.	482
2|0	706|9 4	12)84832
£.	353 9 4 anſ.	2|0)706|9 4*d*.
		£. 353 9 4 anſ.

d.	(70)	By Proportion.
6 = ½	321 at 15*s*. 9*d*.	1 : 15 9 :: 321
	15	12 189
	4815	189 2889
3 = ½	160 6*d*.	2568
	80 3	321
2|0	505|5 9	12)60669
£.	252 15 9 anſ.	2|0)505|5 9*d*.
		£. 252 15 9 anſ.

(71)

d.	(71)	By Proportion.	
6 = ½	218 at 16*s.* 10*d.*	1 : 16 10	:: 218
	16	12	202
	3488	202	436
3 = ½	109		4360
1 = ⅓	54 6*d.*		
	18 2		12)44036
2|0	366|9 8		2|0)366|9 8*d.*
£.	183 9 8 anſ.		£. 183 9 8 anſ.

d.	(72)	By Proportion.	
4 = ⅓	466 at 17*s.* 4*d.*	1 : 17 4	:: 466
	17	12	208
	7922	208	3728
	155 4*d.*		9320
2|0	807|17 4		12)96928
£.	403 17 4 anſ.		2|0)807|17 4*d.*
			£. 403 17 4

d.	(73)	By Proportion.	
6 = ½	621 at 18*s.* 6*d.*	1 : 18 6	:: 621
	18	12	222
	11178	222	1242
	310 6*d.*		1242
			1242
2|0	1148|8 6		12)137862
£.	574 8 6 anſ.		2|0 1148|8 6*d.*
			£. 574 8 6 anſ.

(74)

```
d.              (74)                             By Proportion.
6 = ½ | 123 at 19s. 10½d.      1 : 19   10½ :: 123
      |  19                         12          954
      | ------                     ----        -----
      | 2337                       238          492
3 = ½ |   61  6d.                    4         615
1 = ⅓ |   30  9                    ----       1107
½ = ½ |   10  3                    954       -------
      |    5  1½                             4)117342
      | -----------                          -------
  2|0 | 2441|4  7½                         12)29335  ½
      | ----------                         -----------
   £. | 122  4  7½ anſ.                   2|0)2441|4  7
      | ----------                        -------------
                                         £.122  4  7½ anſ.
                                          -----------
```

RULE IV.

```
s.              (75)                           By Proportion.
10= ½ | 112 at 1l. 10s.            1 : 1  10 :: 112
      |  56                            20         30
      | ----                          ----       ----
   £. | 168 anſ.                       30   2|0)336|0
      | ----                                  -------
                                            £. 168 anſ.
                                               ----
```

```
s. d.           (76)                              By Proportion.
10 0 = ½ | 412 at 1l. 16s. 7d     1 : 1  16  7 :: 412
 5 0 = ½ | 206                        20               439
 1 0 = ⅕ | 103                       ----             -----
 0 6 = ½ |  20 12s.                   36              3708
 0 1 = ⅙ |  10  6                     12             1236
         |   1 14  4                 ----           1648
         | -----------               439            -----
      £. | 753 12  4 anſ.                      12)180868
         | -----------                         ---------
                                             2|0)1507|2  4d.
                                              ------------
                                             £.753  12  4 a.
                                              ------------
```

(77)

```
 s.          (77)
10 = ½ | 244 at 2l. 10s.
       |   2
       | ----
       | 488
       | 122
       | ----
    £. | 610 anſ.
       | ----
```

By Proportion.

```
1 : 2   10 :: 244
    20          50
    --         ---
    50    2|0)1220|0
          ---------
          £. 610 anſ.
             ---
```

```
 s.          (78)
10 = ½ | 321 at 3l. 15s.
       |   3
       | ---
       | 963
 5 = ½ | 160 10s.
       |  80  5
       | -------
    £. | 1203 15 anſ.
       | -----------
```

By Proportion.

```
1 : 3   15 :: 321
    20          75
    --        ----
    75        1605
             2247
             ----
        2|0)2407|5
            -------
        £. 1203 15 anſ.
           --------
```

```
 s.          (79)
10 = ½ | 412 at 4l. 16s.
       |   4
       | -- -
       | 1648
 5 = ½ | 206
 1 = ⅕ | 103
       |  20 12s.
       | -------
    £. | 1977 12 anſ.
       | -----------
```

By Proportion.

```
1 : 4   16 :: 412
    20          96
    --         ---
    96        2472
             3708
             ----
        2|0)3955|2
            ------
        £. 1977 12 anſ.
           -------
```

(80)

s. d.				
5 0 = ¼	146 at 5*l.* 6*s.* 6½*d.*			
	5			
	730			
1 0 = ⅕	36	10*s.*		
0 6 = ½	7	6.		
0 ½ = $\frac{1}{12}$	3	13.		
	0	6	1*d.*	
£.	777	15	1	anſ.

By Proportion.

1 : 5 6 6½ :: 146
20
106
12
1278
4
5114
146
30684
20456
5114
4)746644
12)186661
2[0)155515 1*d.*
£.777 15. 1 anſ.

(81)

s. d.		
5 0 = ¼	432 at 6*l.* 7*s.* 6*d.*	
	6	
	2592	
2 6 = ½	108	
	54	
£.	2754	anſ.

By Proportion.

1 : 6 7 6 :: 432
20
127
12
1530

432
1530
1296
2160
432
12)660960
2[0)55081[0
£.2754 anſ.

```
 s.            (82)                   By Proportion.
10 = 1/2 | 96 at 7l. 15s.            1 : 7  15 :: 96
         |  7                            20
         | ———                          ———
         | 672                           155
 5 = 1/2 |  48                              8×12=96
         |  24                          ———
         | ———                          1240
     £.    744 anſ.                       12
                                        ———
                                   2|0)1488|0
                                       ————
                                    £. 744 anſ.
```

```
 s. d.          (83)                  By Proportion.
10 0 = 1/2 | 100 at 8l. 16s. 4d.     1 : 8  16  4 :: 100
           |   8                         20
           | ———                        ———
           | 800                        176
 5 0 = 1/2 |  50                         12
 1 0 = 1/5 |  25                        ———
 0 4 = 1/3 |   5                        2116
           |   1  13  4                  100
           | —————————                  ————
      £.   | 881  13  4 anſ.       12)211600
             —————————                 ————
                                  2|0)17631|3  4d.
                                      ——————
                                   £. 881  13  4 anſ.
```

```
 s. d.          (84)                  By Proportion.
10 0 = 1/2 | 220 at 12l. 10s.      1 : 12  10 :: 220
           |  12                        20         250
           | ———                       ———         ———
           | 2640                       250         110
           |  110                                   44
           | ———                                   ———
      £.   | 2750 anſ.                        2|0)5500|0
             ——                                 ————
                                             £. 2750 anſ.
```

(85)

```
s.  d.           (85)                     By Proportion.
10 0 = 1/2 | 421 at 17l. 13s.     1 : 17  13 :: 421
           |  17                      20         353
           | ----                    ---         ---
           | 7157                    353        1263
 2 0 = 1/5 |  210 10s.                          2105
 1 0 = 1/2 |   42  2                           1263
           |   21  1                           ----
           | --------                    2|0)14861|3
        £. | 7430 13 ans.                   -------
                                        £.7430 13 ans.
```

```
s.  d.           (86)                     By Proportion.
10 0 = 1/2 | 48 at 18l. 19s.       1 : 18  19 :: 48
           | 18                         20
           | ---                        379
           | 864                          4×12=48
 5 0 = 1/2 |  24                       ----
 2 6 = 1/2 |  12                       1516
 1 3 = 1/2 |   6                         12
 0 3 = 1/5 |   3                   2|0)1819|2
           |   0  12                 £. 909 12 ans.
           | --------
        £. | 909 12 ans.
```

R U L E V.

```
      (87)                          By Proportion.
   124 at 2s.                  1  :  2  ::  124
     1                                        2
   ---                                      ----
£. 12 8 ans.                          2|0)24|8
                                          ----
                                     £. 12 8 ans.
```

```
      (88)                           (89)
   222 at 4s.                    683 at 6s.
     2                             3
   ---                            ---
£. 44 8 ans.                  £. 204 18 ans.
```

(90)
482 at 8*s.*
4
£. 192 16 anſ.

(91)
422 at 10*s.*
5
£. 211 0 anſ.

(92)
683 at 12*s.*
6
£. 409 16 anſ.

(93)
684 at 14*s.*
7
£. 478 16*s.* anſ.

(94)
322 at 16*s.*
8
£. 257 12 anſ.

(95)
344 at 18*s.*
9
£. 309 12 anſ.

(96)
242 at 34*s.*
17
£. 411 8 anſ.

(97)
364 at 56*s.*
28
291 4
728
£. 1019 4

(98)
482 at 80*s.*
40
£. 1928 0 anſ.

(99)
$\frac{1}{2}$)365 at 11*s.*
5$\frac{1}{2}$
182 10
18 5
£. 200 15 anſ.

(100)

(100)

½)246 at 17*s.*	
8½	
196	16
12	6
£. 209	2 anſ.

(101)

⅓)690 at 6*s.* 8*d.*	
3⅓=3*s.* 4*d.*	
207	0
23	0
£. 230	0 anſ.

This Rule is univerſally good for multiplying half any number of ſhillings, and alſo pence, into the given quantity. The double of the right-hand figure and overplus fraction (if any) of that product will be ſhillings, and the reſt of the figures pounds, for the anſwer.

RULE VI.

(102)

qr. lb.	£.	*s.*	
1 0 = ¼	1	5	
		4	
	5	0	
	0	6	3
£.	5	6	3 anſ.

Or thus.

qr.	£.	*s.*	
1 = ¼	1	5	
	0	6	3
s.	*cwt.*		
5 = ¼	4		
	1		
	0	6	3
£.	5	6	3 anſ.

(103)

qrs. lb.	£.	*s.*	*d.*
2 0 = ½	2	6	4
			3
	6	19	0
0 14 = ¼	1	3	2
	0	5	9½
£.	8	7	11½ anſ.

(104)

qrs. lb.	£.	*s.*	*d.*
2 0 = ½	6	16	
		6×12=72	
	40	16	
		12	
	489	12	
1 0 = ½	3	8	
0 14 = ½	1	14	
0 7 = ½	0	17	
	0	8	6
£.	495	19	6 anſ.

(105)

qr.lb.	*£.*	*s.*	
2 0 = $\frac{1}{2}$	6	16	
		6×6+1=37	
	40	16	
		6	
	244	16	
	6	16	
1 0 = $\frac{1}{2}$	3	8	
0 14 = $\frac{1}{2}$	1	14	
0 7 = $\frac{1}{2}$	0	17	
	0	8	6
£.	257	19	6 anſ.

(106)

cwt.qr.	*£.*	*s.*	
10 0 = $\frac{1}{2}$	19	19	
		9 . 12+5= 113	
	179	11	
		12	
	2154	12	
	99	15	
5 0 = $\frac{1}{2}$	9	19	6
2 2 = $\frac{1}{2}$	4	19	9
1 1 = $\frac{1}{2}$	2	9	$10\frac{1}{2}$
	1	4	$11\frac{1}{4}$
£.	2273	1	$0\frac{3}{4}$ anſ.

(107)

qr. lb.	*£.*	*s.*	*d.*
2 0 = $\frac{1}{2}$	3	5	4
0 14 = $\frac{1}{4}$	1	12	8
0 7 = $\frac{1}{2}$	0	8	2
	0	4	1
£.	2	4	11 anſ.

(108)

lb.	*£.*	*s.*	*d.*
14 = $\frac{1}{8}$	6	10	8
2 = $\frac{1}{7}$	0	16	4
1 = $\frac{1}{2}$	0	2	4
	0	1	2
£.	0	19	10 anſ.

(109)

s. d.	*cwt.*		
10 0 = $\frac{1}{2}$	781		
5 0 = $\frac{1}{2}$	390	10*s.*	
1 8 = $\frac{1}{3}$	195	5	
0 5 = $\frac{1}{4}$	65	1	8
0 $2\frac{1}{2}$ = $\frac{1}{2}$	16	5	5
0 $0\frac{1}{2}$ = $\frac{1}{5}$	8	2	$8\frac{1}{2}$
	1	12	$6\frac{1}{2}$
	1	9	4
£.	1459	6	8 anſ.

qr. lb.	*£.*	*s.*	*d.*
2 0 = $\frac{1}{2}$	1	17	4
1 0 = $\frac{1}{2}$	0	18	8
0 4 = $\frac{1}{7}$	0	9	4
	0	1	4
£.	1	9	4

(110)

s. d.				
10 0 = $\frac{1}{2}$	542			
	6			
	3252			
5 0 = $\frac{1}{2}$	271			
1 0 = $\frac{1}{5}$	135	10		
0 4 = $\frac{1}{3}$	27	2		
0 $0\frac{1}{2}$ = $\frac{1}{8}$	9	0	8	
	1	2	7	
	5	2	$3\frac{1}{4}$	$\frac{1}{2}$
£.	3700	17	$6\frac{1}{4}$	$\frac{1}{2}$

cwt.	£.	s.	d.	
10 = $\frac{1}{2}$	6	16	$4\frac{1}{2}$	
5 = $\frac{1}{2}$	3	8	$2\frac{1}{4}$	
	1	14	1	$\frac{1}{2}$
£.	5	2	$3\frac{1}{4}$	$\frac{1}{2}$

(111)

oz dwt gr	£.	s.		
6 0 0 = $\frac{1}{2}$	3	6		
		12		
	39	12		
3 0 0 = $\frac{1}{2}$	1	13		
1 0 0 = $\frac{1}{3}$	0	16	6	
0 10 0 = $\frac{1}{2}$	0	5	6	
0 5 0 = $\frac{1}{2}$	0	2	9	
0 0 12 = $\frac{1}{10}$	0	1	$4\frac{1}{2}$	
	0	0	$1\frac{1}{2}$	$\frac{6}{10} = \frac{3}{5}$
£.	42	11	3	$0\frac{3}{5}$

(112)

s. d.				
10 0 = $\frac{1}{2}$	1426			
	3			
	4278			
5 0 = $\frac{1}{2}$	713			
2 6 = $\frac{1}{2}$	356	10		
	178	5		
	3	7	$9\frac{3}{4}$	
£.	5529	2	$9\frac{3}{4}$	anſ.

R. P.	£.	s.	d.
2 0 = $\frac{1}{2}$	3	17	6
1 0 = $\frac{1}{2}$	1	18	9
0 20 = $\frac{1}{2}$	0	19	$4\frac{1}{2}$
	0	9	$8\frac{1}{4}$
£.	3	7	$9\frac{3}{4}$

RULE

RULE VII.

(113)

d.			s. d.
6 = ½	716⅜ at 6s. 11d.		6 11
	6		3
	4296		8)1 0 9
3 = ½	358		£. 0 2 7⅛
1½ = ½	179		
½ = ⅓	89 6d.		
	29 10		
2|0	495|12 4		
	247 12 4		
	0 2 7⅛		
£.	247 14 11⅛ ans.		

(114)

	s.
265¾ at 14s.	14
14	3
3710	4)42
10 6d.	s. 10 6d.
2|0)372|0 6	
£. 186 0 6 ans.	

(115)

	s.
358⅜ at 17s.	17
17	3
6086	8)51
6 4½	s. 6 4½d
2|0)609|12 4½	
£. 304 12 4½ ans.	

(116)

(116)

d.
6 = $\frac{1}{2}$ | 964$\frac{5}{8}$ at 8*s.* 10$\frac{1}{2}$*d.*
8

7712
3 = $\frac{1}{2}$ | 482
1 = $\frac{1}{3}$ | 241
0$\frac{1}{2}$ = $\frac{1}{2}$ | 80 4
40 2
5 6$\frac{1}{2}$ $\frac{2}{8}$

2|0 | 856|1 0$\frac{1}{2}$ $\frac{2}{8}$

£. 428 1 0$\frac{1}{2}$ $\frac{2}{8}$ anſ.

s. d.
8 10$\frac{1}{2}$*d.*
5

8)44 4$\frac{1}{2}$

s. 5 6$\frac{1}{2}$ $\frac{2}{8}$

(117)

s. d.
10 0 = $\frac{1}{2}$ | 186$\frac{3}{5}$ at 1*l.* 12*s.* 6$\frac{1}{2}$*d.*
2 0 = $\frac{1}{5}$ | 93
0 6 = $\frac{1}{4}$ | 18 12
0 $\frac{1}{2}$ = $\frac{1}{12}$ | 4 13
0 7 9
0 19 6$\frac{1}{4}$ $\frac{1}{5}$

£. 303 12 3$\frac{1}{4}$ $\frac{1}{5}$ anſ.

£. s. d.
1 12 6$\frac{1}{2}$
3

5)4 17 7

£. 0 19 6$\frac{1}{4}$ $\frac{1}{5}$

R U L E VIII.

(118)

908 at 19$\frac{5}{8}$*d.*
19

17252
567 $\frac{1}{2}$

12)17819 $\frac{1}{2}$

2|0)148|4 11

£. 74 4 11$\frac{1}{2}$ anſ.

908
5

8)4540

567 $\frac{4}{8}$

(119)

784 at $5\frac{3}{9}$s.
5

3920
261 4*d.*

2|0)418|1 4*d.*

£. 209 1 4*d.* anſ.

784
3

9)2352

261 4*d.*

(120)
8372 at $\frac{7}{8}$*d.*
7

8)58604

12)7325 $\frac{1}{2}$

2|0)61|0 5

£.30 10 $5\frac{1}{2}$ anſ.

(121)
423 at $\frac{4}{5}$*d.*
4

5)1692

12)338 $\frac{2}{5}$

2|0)2|8 2

£. 1 8 $2\frac{2}{5}$

R U L E IX.

(1)

I. F. I. F. I.
2 = $\frac{1}{6}$ | 6 6 by 3 2
3

12 6
1 1

20 7 anſ.

(2)

I. F. I. F. I.
3 = $\frac{1}{4}$ | 8 4 by 5 3
5

41 8
2 1

43 9 anſ.

Theſe operations are all wrought by Duodecimals.

(3)

I.	F.	I.			F.	I.
4 = $\frac{1}{3}$	12	6		by	8	5
		8				
	100	0				
1 = $\frac{1}{4}$	4	2				
	1	0	6			
	105	2	6	anſ.		

(4)

I.	F.	I.			F.	I.
6 = $\frac{1}{2}$	26	4		by	12	7
		12				
	316	0				
1 = $\frac{1}{6}$	13	2				
	2	2	4			
	331	4	4	anſ.		

(5)

I.	F.	I.			F.	I.
3 = $\frac{1}{4}$	76	6		by	48	3
		6×8=48.				
	459	0				
		8				
	3672	0				
	19	1	6			
	3691	1	6	anſ.		

(6)

I.	F.	I.			F.	I.
6 = $\frac{1}{2}$	38	7		by	45	6
		9×5=45.				
	347	3				
		5				
	1736	3				
	19	3	6			
	1755	6	6	anſ.		

(7)

I.	F.	I.			F.	I.
2 = $\frac{1}{6}$	79	2		by	84	2
		12×7=84.				
	950	0				
		7				
	6650	0				
	13	2	4			
	6663	2	4	anſ.		

(8)

I.	F.	I.			F.	I.
3 = $\frac{1}{4}$	126	6		by	121	3
		11×11=121.				
	1391	6				
		11				
	15306	6				
	31	7	6			
	15338	1	6	anſ.		

(9)

(9)

I.	F.	I.	
4 = $\frac{1}{3}$	764	5	
4 = $\frac{1}{3}$	192	4	
	1528		
	6876		
	764		
	254	9	8
	64	0	0
	16	0	0
Prod.	147022	9	8

(10)

I.	F.	I.	
6 = $\frac{1}{2}$	7681	8	
6 = $\frac{1}{2}$	1926	10	
	46086		
	15362		
	69129		
	7681		
3 = $\frac{1}{2}$	3840	10	
1 = $\frac{1}{3}$	1920	5	
	640	1	8
2 = $\frac{1}{3}$	963	0	0
	321	0	0
Prod.	14801291	4	8

(11)

I. P.	F. I. P. F. I. P
6 0 = $\frac{1}{2}$	7 3 3 by 1 7 6
1 0 = $\frac{1}{6}$	3 7 7 6
0 6 = $\frac{1}{2}$	0 7 3 3
	0 3 7 7 6
Product	11 9 9 4 6

(12)

I. P.	F. I. P. F. I. P.
3 0 = $\frac{1}{4}$	8 6 6 by 7 3 4
	7
	59 9 6
0 4 = $\frac{1}{9}$	2 1 7 6
	0 2 10 2
Product	62 1 11 8

(13)

I. P.	F. I. P. F. I. P
4 0 = $\frac{1}{3}$	4 10 6 by 2 4 8
	2
	9 9 0
0 8 = $\frac{1}{6}$	1 7 6
	0 3 3
	11 7 9 anſ.

(14)

I. P.	F. I. P. F. I. P
2 0 = $\frac{1}{6}$	7 8 6 by 7 2 8
	7
	53 11 6
0 8 = $\frac{1}{3}$	1 3 5
	0 5 1 8
	55 8 0 8 anſ.

(15)

every digit 13 [illegible] 10

```
              (15)                                  (16)
I. P.     F. I. P.   F. I. P.     I. P.        F.  I.  P.      F. I. P
4 0=⅓  |  3  6  3  by 2 4 6      4 0=⅓  |   12  2  10  by  9  6  4
               2                         |           9
       |  ---------                      |  -----------
       |  7  0  6                        |  110  1  6
0 6=⅛  |  1  2  1                2 0=½  |    4  0  11  4
       |  0  1  9  1  6          0 4=⅙  |    2  0   5  8
       |  ------------                   |    0  4   0  11  4
Prod.  |  8  4  4  1  6                  |  -----------------
       |  ------------           Prod.  |  116  6  11  11  4
                                         |  -----------------
```

```
                      (17)
I. P.           F.   I.  P.      F.  I.  P.
6 0 = ½  |     76    3   3   by  84   7   6
         |              12×7=84.
         |  ----------------
         |    915    3   0
         |               7
         |  ----------------
         |   6406    9   0
1 0 = ⅙  |     38    1   7   6
0 6 = ½  |      6    4   3   3
         |      3    2   1   7   6
         |  ------------------------
         |   6454    5   0   4   6 anſ.
         |  ------------------------
```

```
                      (18)
I. P.            F.  I.  P.      F.  I.  P.
1 0 = 1/12 |     87   3   5   by  18   1   6
           |             3×6=18.
           |  ----------------
           |    261  10   3
           |              6
           |  ----------------
           |   1571   1   6
0 6 = ½    |      7   3   3   5
           |      3   7   7   8   6
           |  ------------------------
           |   1580   0   5   1   6 anſ,
           |  ------------------------
```

(19)

I. P.	*F.*	*I.*	*P.*		
1 0 = 1/12	371	2	3		
2 0 = 1/6	181	1	3		
	371				
	2968				
	371				
0 3 = 1/4	30	11	2	3	
	7	8	9	6	9
0 3 = 1/8	30	2	0	0	0
	3	9	3	0	0
	67223	7	2	9	9 anſ.

(20)

I. P.	*F.*	*I.*	*P.*	
4 0 = 1/3	487	10	10	
6 0 = 1/2	186	5	6	
	2922			
	3896			
	487			
1 0 = 1/4	162	7	7	4
0 6 = 1/2	40	7	10	10
	20	3	11	5
3 0 = 1/2	93	0	0	0
1 0 = 1/3	46	6	0	0
0 6 = 1/2	15	6	0	0
0 3 = 1/2	7	9	0	0
0 1 = 1/3	3	10	6	0
	1	3	6	0
	90973	6	5	7 anſ.

(21)

(21)

I. F. I. F. I.
2 = $\frac{1}{6}$ | 18 6 by 1 2
3 1
21 7 anſ.

(22)

I. F. I. F. I.
4 = $\frac{1}{3}$ | 45 6 by 9 4
9
409 6
15 2
424 8 anſ.

(23)

I. F. I. F. I.
6 = $\frac{1}{2}$ | 47 8 by 64 6
8×8=64.
381 4
8
3050 8
23 10
9 | 3074 6
yds. | 341 5 6 anſ.

(24)

I. F. I. F. I.
6=$\frac{1}{2}$ | 864 3 by 62 6
6×10+2=62
5185 6
10
51855 0
1728 6
432 1 6
9 | 54015 7 6
yds. | 6001 6 7 6 anſ.

(25)

F. I. F. I.
60 9 by 22 3
2
121 6
11
1336 6
15 2 3
9)1351 8 3
yds. 150 1 8 3 anſ.

(26)

F. I. F. I.
40 6 by 9 3
9
364 6
10 1 6
9)374 7 6
yds. 41 5 7 6 anſ.

(27)

I. P. | *F. I. P.* *F. I. P.*
4 0 = $\frac{1}{3}$ | 3 8 9 by 1 4 6
0 6 = $\frac{1}{8}$ | 1 2 11
| 0 1 10 4 6
Ft. | 5 1 6 4 6 ans.

(28)

I. | *F. I. P.* *F. I. P*
4 0 = $\frac{1}{3}$ | 3 7 9 by 1 5 1
1 0 = $\frac{1}{4}$ | 1 2 7
0 1 = $\frac{1}{12}$ | 0 3 7 9
| 0 0 3 7 9
| 5 2 3 4 9
3·5 = (15
| 15 6 10 2 3
| 5
Ft. | 77 10 2 11 3 ans.

(29)

I. P. | *F. I.* *F. I.*
3 0 = $\frac{1}{4}$ | 1 6 breadth by 1 3 depth
| 0 4 6
3 0 = $\frac{1}{4}$ | 1 10 6 *F. I. F. I.*
4×4=16+3=16 3 length.
| 7 6 0
| 4
| 30 0 0
| 0 5 7 6
Ft. | 30 5 7 6 solid content.

(30)

I. P. | *F. I. P.* *F. I. P.*
2 0 = $\frac{1}{6}$ | 1 5 6 breadth by 1 2 10 depth
0 8 = $\frac{1}{3}$ | 0 2 11
0 2 = $\frac{1}{4}$ | 0 0 11 8
| 0 0 2 11
3 0 = $\frac{1}{4}$ | 1 9 7 7 *I. P. F. I. P.*
12+3 7=12 3 7 length
| 21 7 7 0
0 6 = $\frac{1}{6}$ | 0 5 4 10 9
0 1 = $\frac{1}{6}$ | 0 0 10 9 9 6
| 0 0 1 9 7 7
Ft. | 22 2 0 6 2 1 solid content.

TARE AND TRET.

	C.	qr.	lb.	
Groſs	97	1	8	
Tare	6	1	7	
Neat weight	91	0	1	anſ.
	97	1	8	proof.

(2)

lb.		C.	qr.	lb.	
		9	2	8	
14				8	
8					
		76	2	8	groſs
112	=	1	0	0	tare
	Anſ.	75	2	8	neat weight
		76	2	8	proof.

(3)

			C.	qr.	lb.	
	lb.					
	23					
	14		C.	qr.	lb.	
			5	2	5	
28	4)322				2×7=14.	
	7)80 2	14lb.	11	0	10	
	4)11 3				7	
			77	2	14	groſs
	Tare 2 3 14	=	2	3	14	tare
		Anſ.	74	3	0	neat weight
			77	2	14	proof

(4)

	lb.	*C.*	*qr.*	*lb.*	
	24	1	3	10	
	10			6×4=24.	
Tare	2 0 16	11	0	4	
				4	
		44	0	16	groſs
		2	0	16	tare
		42	0	0	neat weight
		44	0	16	proof

(5)

	lb.	*C.*	*qr.*	*lb.*	
	18	1	2	13	
	4×5=20			5×4=20.	
	2 16	8	0	9	
	5			4	
Tare	3 0 24	32	1	8	groſs
		3	0	24	tare
Anſ.		29	0	12	neat wt.
		32	1	8	proof

C A S E II.

(6)

	C.	*Q.*	*lb.*	
	4	2	6	
			6	
14 = $\frac{1}{8}$	27	1	8	groſs
	3	1	18	tare
Anſ.	23	3	18	neat weight

(7)

lb.	C.	qr.	lb.	
16=$\frac{1}{7}$	127	3	14	groſs
	18	1	2	tare
Anſ.	109	2	12	neat wt.

(8)

	C.	qr.	lb.	
	2	1	5	
			6	6×6=36
	13	3	2	
			6	
lb.				
14=$\frac{1}{8}$	82	2	12	groſs
7=$\frac{1}{2}$	10	1	8$\frac{1}{2}$	} ſubtract
	5	0	18$\frac{1}{4}$	
	5	0	18$\frac{1}{4}$	tare
Anſ.	77	1	21$\frac{3}{4}$	neat wt.

(9)

	C.	qr.	lb.	
	7	0	0	
			3	
lb.				
14=$\frac{1}{8}$	21	0	0	groſs
7=$\frac{1}{2}$	2	2	14	
3$\frac{1}{2}$=$\frac{1}{2}$	1	1	7	} add
	0	2	17$\frac{1}{2}$	
	1	3	24$\frac{1}{2}$	tare
Anſ.	19	0	3$\frac{1}{2}$	neat wt.

(10)

	C.	qr.	lb.	
	5	2	4	
			4×4=16.	
	22	0	16	
			4	
lb.				
14=$\frac{1}{8}$	88	2	8	groſs
7=$\frac{1}{2}$	11	0	8	} add
	5	2	4	
	16	2	12	tare
Anſ.	71	3	24	neat wt.

(11)

CASE III.

(11)

lb.	*C.*	*qr.*	*lb.*	
$28=\frac{1}{4}$	20	1	4	groſs
$7=\frac{1}{4}$	5	0	8	
	1	1	2	
	6	1	10	tare
* 26	13	3	22	ſuttle
	0	2	$4\frac{1}{13}$	tret
Anſ.	13	1	$17\frac{12}{13}$	neat wt.

*104÷4=26.

(12)

lb.	*C.*	*Q.*	*lb.*	
$14=\frac{1}{8}$	6	2	24	groſs
	0	3	10	tare
26	5	3	14	ſuttle
	0	0	$25\frac{4}{13}$	tret
Anſ.	5	2	$16\frac{9}{13}$	neat wt.

(13)

lb.	*C.*	*Q.*	*lb.*	
	9	1	14	
			12	
$14=\frac{1}{8}$	112	2	0	groſs
$7=\frac{1}{2}$	14	0	7	
	7	0	$3\frac{1}{2}$	
	21	0	$10\frac{1}{2}$	tare
26	91	1	$17\frac{1}{2}$	ſuttle
	3	2	$1\frac{3}{4}$	tret
Anſ.	87	3	$15\frac{3}{4}$	neat wt.

(14)

lb.	*C.*	*Q.*	*lb.*	
	4	2	7	
			8	
$16=\frac{1}{7}$	36	2	0	groſs
$8=\frac{1}{2}$	5	0	24	
	2	2	12	
	7	3	8	tare
26	28	2	20	ſuttle
	1	0	$11\frac{7}{13}$	tret
Anſ.	27	2	$8\frac{6}{13}$	neat wt.

(15)

(15)

	C.	Q.	lb.	
	2	3	14	
			4×7=28.	
	11	2	0	
			7	
14 = $\frac{1}{8}$	80	2	0	groſs
7 = $\frac{1}{2}$	10	0	7	
3½ = $\frac{1}{2}$	5	0	3½	
	2	2	1¾	
	17	2	12¼	tare
26	62	3	15¾	ſuttle
	2	1	18¾ $\frac{17}{26}$	tret
Anſ.	60	1	24¾ $\frac{9}{26}$	neat weight

CASE IV.

(16)

lb.	C.	Q.	lb.		
14=$\frac{1}{8}$	32	3	12		groſs
	4	0	12		tare
26	28	3	0		ſuttle
	1	0	11	13	tret
*168	27	2	16	3	ſuttle
	0	0	18	6	cloff
Anſ.	27	1	25	13	neat wt.

(17)

lb.	C.	Q.	lb.	oz.	
16=$\frac{1}{7}$	64	3	0	0	groſs
8=$\frac{1}{2}$	9	1	0	0	
	4	2	14	0	tare
26	60	0	14	0	ſuttle
	2	1	7	0	tret
168	57	3	7	0	ſuttle
	0	1	10	8⅔	cloff
Anſ.	50	1	24	7⅓	neat wt.

---

* 2 *lb.* is the 168th part of 3 *cwt.* or 336 *lb.*

(18)

	C.	Q.	lb.	
	12	1	16	
			6×6=36.	
	74	1	12	
			6	
lb.				
14=$\frac{1}{8}$	446	0	16	groſs
7=$\frac{1}{2}$	55	3	2	
	27	3	15	
	83	2	17	tare
26	362	1	27	ſuttle
	13	3	21$\frac{1}{2}$	tret
168	348	2	5$\frac{1}{2}$	ſuttle
	2	0	8$\frac{1}{4}$ $\frac{13}{28}$	cloff
Anſ.	346	1	25 $\frac{15}{28}$	neat wt

(19)

	C.	Q.	lb.	oz.	
	9	1	14		
			6		
	56	1	0		groſs
	5	1	24		tare
26	50	3	4	0	ſuttle
	1	3	22	12	tret
168	48	3	9	4	ſuttle
	0	1	4	8	cloff
Anſ.	48	2	4	12	neat wt.

(20)

lb.	C.	Q.	lb.	
16 = $\frac{1}{7}$	28	2	0	groſs
2 = $\frac{1}{8}$	4	0	8	
	0	2	1	
	4	2	9	tare
26	23	3	19	ſuttle
	0	3	19	tret
168	23	0	0	ſuttle
	0	0	15$\frac{1}{3}$	cloff
Anſ.	22	3	12$\frac{2}{3}$	neat weight

(21)

SIMPLE INTEREST.

(1)
364
5
£. 18|20
20
s. 4|00
Anſ. £. 18 4

(2)
2)364
4½
1456
182
£. 16|38
20
s. 7|60
12
d. 7|20
Anſ. £. 16 7 7⅕

(3)
£. 364
4
14|56
20
11|20
12
2|40
4
1|60
Anſ. £. 14 11 2¼ ⅗ qrs.

(4)
£. s. d.
500 10 6¼
5
£. 25|02 12 7¼
20
52
12
6|31
4
1|25
Anſ. £. 25 0 6¼ ¼

(5)

(5)

£. s. d.
2)862 16 8
$4\frac{1}{2}$
3451 6 8
431 8 4
£. 38|82 15 0
20
s. 16|55
12
d. 6|60
4
qr. 2|40
Anſ. £. 38 16 $6\frac{1}{2}$ $\frac{2}{5}$

(6)

£. s. d.
1000 16 8
4
£. 40|03 6 8
20
s. 0|66
12
d. 8|00
Anſ. £. 40 0 8

(7)

£.
486
5
24|30
20
6|00

£. s.
24 6
5
121 10 int.

(8)

£.
884
5
£. 44|20
20
s. 4|00

£.
44 4
7
309 8 int.
884 0 prin.
£. 1193 8 amount

(9)

£.
2)1001
4
4004 s.
500 10
£. 45|04 10
20
90
12
d. 10|80

£. s. d.
45 0 $10\frac{4}{5}$
6
270 5 $4\frac{4}{5}$ int.
1001 0 0 prin.
£1271 5 $4\frac{4}{5}$ amt.

(10)

£.
$\frac{1}{2}$)460
$3\frac{3}{4}$
1380
$\frac{1}{2}$)230
115
£. 17|25
20
s. 5|00

£. s.
17 5
4
69 0 int.
460 0 prin.
£. 529 0 amt.

(11)

£.
924
5
£. 46|20
20
s. 4|00

mo. 2 = $\frac{1}{6}$) £. 46 s. 4

£. 7 14 anſ

(12)

£.
1205
4
48|20
20
4|00

mo. 6 = $\frac{1}{2}$) £. 48 s. 4

£. 24 2 anſ.

(13)

£.	s.	d.
640	8	4
		5
32|02	1	8
20		
0|41		
12		
5|00		

	£.	s.	d.	
	32	0	5	int. for 1 year
			7	
	224	2	11	int for 7 years
	640	8	4	principal
£.	864	11	3	amount

(14

£.	s.	d.
9640	16	8
		5
482|04	3	4
20		
0|83		
12		
10|00		

mo.	£.	s.	d.	
6 = $\frac{1}{2}$	482	0	10	int. for 1 year
			4	
mo.	1928	3	4	int. for 4 years
3 = $\frac{1}{2}$	241	0	5	int. for 6 mon.
	120	10	2$\frac{1}{2}$	int. for 3 mon.
	2289	13	11$\frac{1}{2}$	int.
	9640	16	8	principal
	11930	10	7$\frac{1}{2}$	amount

(15)

£.
20
5
£. 1|00

w. s. w.
52 : 20 :: 13
13
52)260
5 int. for 13 weeks
20 0 principal
£. 20 5 amount.

(16)

£.
500
5
25|00
£.
25 0 int. for 1 year
4
100 0 int. for 4 years
18 15 int. for 39 weeks
500 0 principal
£. 618 15 amount

w. £. w.
52 : 25 :: 39
5×5=25
195
5
52)975(18*l.*
52
455
416
39
20
52)780(15*s.*
52
260
260

(17) £. D. £. s. D.
641 365 : 32 1 :: 50
5 20
32|05 641
20 50
1|00 2|0)
365)32050(8|17
2920
£. 4 7 $9\frac{1}{2}\frac{290}{365}$ Anſ.
. 2850
2555
. 295
12
365)3540(9
3285
. 255
4
365)1020($\frac{1}{2}$
730
290

(18) £. D. £. D.
$\frac{1}{2}$)2000 365 : 90 :: 63
$4\frac{1}{2}$ 90
8000 £. s. d.
1000 365)5670(15 10 $8\frac{16}{73}$ Anſ.
£. 90|00 365
2020
1825
. 195
20
365)3900(10*s.*
365
. 250
12
365)3000(8*d.*

(19)

£. s. d.
5800 16 8
4

£ 232|03 6 8
20

s. 0|66
12

d. 8|00

D. £. s. d. D.
365 : 232 0 8 :: 260
20

4640
12

55688
260

3341280
111376
12)
365)14478880(39668
1095

·3528
3285

·2438
2190

·2488
2190

·2980
2920

··60

2|0)3301|5 8

£.165 5 8 $\frac{12}{73}$ intereſt
5800 16 8 prin.

£.5966 2 4 $\frac{12}{73}$ amt.

£. s. d.
563 12 6$\frac{1}{2}$
5
28|18 2 8$\frac{1}{2}$
20
3|62
12
7|52
4
2|10

(20)
D. £. s. d. D.
365 : 28 3 7$\frac{1}{2}$ $\frac{1}{10}$ :: 265
20
563
12
6763
4
27054
10
270541
265
1352705
1623246
541082
365)71693365(1964|20 10)
365
3519
3285
.2343
2190
.1533
1460
..736
730
..65

4)19642
12)4910 $\frac{1}{2}$
2|0)40|19 2
£.20 9 2$\frac{1}{2}$ $\frac{13}{73}$ Anſ.

COMMISSION.

(1)
£.
½)500
2½
1000
250 -
12|50
20
10|00
Anſ. £.12 10

(2)
369
2
£.7|38
20
s. 7|60
12
d. 7|20
Anſ. £. 7 7 7⅓

(3)
£. s. d.
748 11 8
3
22|45 15 0
20
9|15
12
1|80
4
3|20
Anſ. £.22 9 1¾ ⅕

(4)
£.
1900
5⅞
9500
1662 10s.
111|62 10s.
20
12|50
12
6|00
Anſ. 111 12 6

1900
7
8)13300
1662 10s.

BROKAGE.

(1)

£.
6|40
20
8|00

s. £. s.
5=¼)6 8
£. 1 12 Anſ

£.
8|45
20
9|00

(2)

s. £. s.
10=½)8 9
£. 4 4 6

(3)

£. s. d.
½)202 1 8
2½
404 3 4
101 0 10
5|05 4 2
20
1|04
12
50
4
2|00

Anſ. £.5 1 0½

(4)

4360 8 4
3
130|81 5 0
20
16|25
12
3|00

Anſ. £.130 16 3

(5)

£. s. d.
¼)240 16 8
3¼
722 10 0
60 4 2
7|82 14 2
20
16|54
12
6|50
4
2|00

Anſ. £.7 16 6½

INSURANCE.

(1)
£.
½)4680
10½
46800
2340
491|40
20
8|00
Anſ. £.491 8 0

(2)
£.
½)9000
10¾
90000
½) 4500
2250
967|50
20
10|00
Anſ. £.967 10 0

(3)
£. s.
½)782 10
3×5+½=15½
2347 10
5
11737 10
391 5
121|28 15
20
5|75
12
9|00
Anſ. £.121 5 9

(4)
£.
780
5⅜
3900
292 10
41|92 10
20
18|50
12
6|00
Anſ. 41 18 6

£.
780
3
8)2340
2|92 10=⅜
20
18|50
12
6|00

(5)

(5)

£.
$\frac{1}{2}$)1500
$6\frac{1}{2}$

9000
750

97150
20

10|00

Anſ. £.97 10

PURCHASING STOCKS.

(1)

£.
2680
10

268|00 int. for exceſs above 100.
2680 principal

£. 2948 Anſ.

By Practice.
per cent.
$100=1$)2680

$10=\frac{1}{10}$)2680
268

£. 2948

(2)

£. s.
640 8
$4\times5=20$

2561 12
5

128|08 0
20

1|60
12

7|20

£. s. d.
128 1 $7\frac{1}{3}$ int. for exceſs
640 8 0 principal

£. 768 9 $7\frac{1}{3}$ Anſ.

(3)

(3)

£.
$\frac{1}{2}$)926
$6\times5+\frac{1}{2}=30\frac{1}{2}$
5556
5
27780
463
282|43
20
8|60
12
7|20

£. s. d.
926 0 0 principal
282 8 $7\frac{1}{5}$ int. for exceſs
£.1208 8 $7\frac{1}{5}$ Anſ.

(4)

£.
1752
$15\frac{5}{8}$
26280
$1095=\frac{5}{8}$
273|75
20
15|00

1752
5
8)8760
10|95
20
19|00

£. s.
273 15 int. for exceſs
1752 0 principal
£.2025 15 Anſ.

(5)

£.
8)1200
$7\times12=84$
8400
12
100800
150
1009|50
20
10|00
Anſ. £. 1009 10

(6)

£.
$\frac{3}{8}+\frac{1}{8}=\frac{1}{2}$)1300
90
117000
650
1176|50
20
10|00
Anſ. £. 1176 10

DISCOUNT

DISCOUNT.

(1) £. £. £.

100 105 : 5 :: 120

5 5

£. s. d.

5|00 intereſt 105)600(5 14 $3\frac{1}{4}\frac{5}{7}$ Anſ.

525

·75

20

105)1500(14s.

105

·450

420

·30

12

105)360(3d.

315

·45

4

105)180($\frac{1}{4}$q.

(2) £. £. £.

100 105 : 5 :: 50

5 5

£. s. d.

5|00 intereſt 105)250(2 7 $7\frac{1}{4}\frac{5}{7}$ diſc.

210

·40

20

105)800(7s.

735

·65

12

105)780($7\frac{1}{4}$d. $\frac{75}{105}$

735

(3)

£. £. £.
105 : 100 :: 200
200

£. s. d.
105)20000(190 9 $6\frac{1}{4}\,\frac{1}{7}$ Anſ.
105
·950
945
··50
20
105)1000(9s.
945
·55
12
105)660(6d.
630
·30
4
105)120($\frac{1}{4}$
105
·15

mo. £. (4)
3=$\frac{1}{4}$)5 per cent.

1 5 intereſt
100 0 principal

101 5 : 1 5 :: 36
20 20 20
2025 25 720
5×5=25
3600
5
2055)18000(8s.
16200
·1800
12
2025)21600(10d.
2025
·1350
4
2025)5400($\frac{1}{2}$qr.
4050
1350

£. s. d.
From 36 0 0 principal
Take 0 8 $10\frac{1}{2}\,\frac{2}{3}$ diſcount

£.35 11 $1\frac{1}{4}\,\frac{1}{3}$ Anſ.

(5)

£. s.
4 10
3

int. 13 10
prin. 100 0

£. s. £. s.
amt. 113 10 : 13 10 :: 573 16
20 20 20

2270 270 11476
270

803320
22952

2|0)
2270)309852|0(136|4
2270 £.68 4 11$\frac{3}{4}$ $\frac{83}{227}$ diſc.

.8285
6810

14752
13620

.11320
9080

2240
12

2270)26880(11*d.*
2270

.4180
2270

1910
4

2270)7640($\frac{3}{4}$*qrs.*
6810

.830

(6) *s.*
20
3
8)60
7 6 = $\frac{3}{8}$
4 0 0
mo.
6 = $\frac{1}{2}$) 4 7 6
3 = $\frac{1}{2}$) 2 3 9
1 1 10$\frac{1}{2}$

int. 7 13 1$\frac{1}{2}$
prin. 100 0 0

£. £.
amt. 107 13 1$\frac{1}{2}$: 100 :: 130
20 20
2153 2600
12 12
25837 31200
4 4
103350 124800
100
£. *s.* *d.*
103350)12480000(120 15 1 $\frac{54600}{103350}$
103350
214500
206700
78000
20
103350)1560000(15*s.*
103350
526500
516750
9750
12
103350)117000(1*d.*

(7)

(7)

D. *£.* *D.*
365 : 5 :: 73
5
365)365
intereſt 1
principal 100
£. *£.* *s.* *d.*
101 : 1 :: 399 13 4
20 20
2020 7993
12 12
£. *s.* *d.*
24240)95920(3 19 $1\frac{1}{2}\frac{82}{101}$ diſ.
72720
23200
20
24240)464000(19*s.*
24240
221600
218160
··3440
12
24240)41280(1*d.*
24240
17040
4
24240)68160(2*qrs.*
48480
19680

£. *s.* *d.*
399 13 4 prin.
3 19 $1\frac{1}{2}\frac{82}{101}$ diſ.
£. 395 14 $2\frac{1}{4}\frac{19}{101}$ Anſ.

COMPOUND INTEREST.

```
  £.       £.  s.           (1)
  50       50   0   firſt year's principal
   5        2  10   firſt year's intereſt
 ----     -------
 2|50      52  10   ſecond year's principal
   20           5
 ----     -------      £.  s. d.
10|00    2|62  10      52  10  0=ſecond year's prin.
           20           2  12  6=ſecond year's int.
          ---          ---------
         12|50         55   2  6=third year's prin.
           12                  5
          ---          ---------
          6|00        2|75 12  6
                          20
                        -----
                        15|12
                           12
                        -----
                         1|50
                            4
                        -----
                         2|00

£.  s.  d.
55   2  6  =third year's principal
 2  15  1½=third year's intereſt
-----------
57  17  7½ amount Anſwer
-----------

     £.    £.         Or thus :
5=1/20)50           = firſt year's principal
        2  10       = firſt year's intereſt
      --------
1/20)52  10         = ſecond year's principal
      2  12  6      = ſecond year's intereſt
     ----------
1/20)55   2  6      = third year's principal
      2  15  1½     = third year's intereſt
     ----------
     57  17  7½ amount anſwer
     ----------
```

(2)

```
100=1ſt prin.        100          (2)       105   0
  5                    5+                     5   5+
 ---                  ---                   ---------
5|00                 105=2d prin.            110  5=3d prin.
                       5                          5
                      ---                   ---------
                     5|25                    5|51  5
                       20                      20
                      ---                     ---
                     5|00                   10|25
                                               12
110   5   0                                   ---
  5  10   3+                                 3|00
----------                           £.  s.  d.
115  15   3=4th prin.               115  15  3
          5                           5  15  9 3/20+
-------------                       --------------
5|78 16   3                         121  11  0 3/20 Anſwer
  20                                --------------
 ---
15|76
  12
 ---
9|15
```

Or thus:

```
             £.
1/20)100     -     -     principal
       5     -     -     1ſt year's intereſt
     ---
1/20)105     -     -     2d year's principal
       5   5       -     intereſt
     -------
1/20)110   5   -   -     3d year's principal
       5  10  3    -     intereſt
     ------------
1/20)115  15  3        - 4th year's principal
       5  15  9 3/20     intereſt
     ----------------
Anſwer 121  11  0 3/20 amount
       ----------------
```

It is not neceſſary that the payments ſhould be yearly, for the rule will hold good for any aliquot part of a year, but not for a compleat time, and take the ſame part for the reſult as is the part of the time, for the rule takes no notice of ſuch parts.

```
  £.              £.   s.       (3)              £.   s.  d.
  100 prin.      100   0                        2)5    2  6
    5              2  10                        ------------
 -----          ----------                        2   11  3
2)5|00           102  10 1ſt ½ yr. amt.         102   10  0
 -----                 5                        ------------
  2|10          ----------                      105    1  3 2d ½ yrs. amt.
                 5|12  10                                 5
                   20                           ------------
                 -----                          5|25    6  3
                 2|50                             20
                   12                           -----
                 -----                          5|06
                 6|00                             12
                                                -----
                                                 75
                                                  4
                                                -----
                                                3|00

 £.  s.  d.              £.  s.  d.              £.  s.  d.
2)5   5  0¾             2)5   7  8¼             2)5  10  4½
 -----------             -----------             -----------
  2  12  6¼               2  13  10               2  15  2¼
105   1  3              107  13  9¼             110   7  7¼
---------------         ---------------         ---------------
107  13  9¼ 3d ½ yr.    110   7  7¼ 4th ½ yr.   113   2  9½ 5th ½ yr.
          5  amt.                 5  amt.                 5  amt.
---------------         ---------------         ---------------
5|38  8  10¼            5|51  18  0¼            5|65  13  11½
  20                      20                      20
-----                   -----                   -----
7|68                    10|38                   13|13
  12                      12                      12
-----                   -----                   -----
8|26                    4|56                    1|67
   4                       4                       4
-----                   -----                   -----
1|05 £.  s.  d.         2|25 £.  s.  d.         2|70 £.  s.  d.
    2)5  13  1½             2)5  15  11½            2)5  18  10¼
     -----------             -----------             -----------
      2  16  6¾               2  17  11¾              2  19  5
    113   2  9½             115  19  4¼             118  17  4
---------------         ---------------         ---------------
115  19  4¼ 6th ½ yr.   118  17  4 7th ½ yr. £.121  16  9 8th ½ yr.
          5  amt.                 5  amt.         ------  --- amt. anſ.
---------------         ---------------
5|79  16  9¼            5|94   6  8
  20                      20
-----                   -----
15|96                   18|86
  12                      12
-----                   -----
11|61                   10|40
   4                       4
-----                   -----
2|45                    1|60
```

per cent.	£.			Or thus:
5=1/20	100			- - - principal
½	5			
	2	10		
	100	0		
20	102	10		- - the 1ſt half year's amount
½	5	2	6	
	2	11	3	
	102	10	0	
20	105	1	3	the 2d half year's amount
½	5	5	0¾	
	2	12	6¼	
	105	1	3	
20	107	13	9¼	the 3d half year's amount
½	5	7	8¼	
	2	13	10	
	107	13	9¼	
20	110	7	7¼	the 4th half year's amt.
½	5	10	4½	
	2	15	2¼	
	110	7	7¼	
20	113	2	9½	the 5th half year's amt.
½	5	13	1½	
	2	16	6¾	
	113	2	9½	
20	115	19	4¼	the 6th half year's amt.
½	5	15	11½	
	2	17	11¾	
	115	19	4¼	
20	118	17	4	the 7th half year's amt.
½	5	18	10¼	
	2	19	5	
	118	17	4	
Anſwer	121	16	9	the 8th half year's amt.

(4)

£.
100
5
4)5|00
1 5
100 0
101 5 1ſt quar. amt.
5
5|06 5
20
1|25
12
3|00

£. s. d.
4)5 1 3
1 5 3¾
101 5 0
102 10 3¾ 2d qr. amt.
5
5|12 11 6¾
20
2|51
12
6|18

£. s. d.
4)5 2 6
1 5 7½
102 10 3¾
103 15 11¼ 3d qr. amt.
5
5|18 19 8¼
20
3|79
12
9|56
4
2|25

4)5 3 9½
1 5 11¼
103 15 11¼
105 1 10½ 4th quar. amt.
5
5|25 9 4½
20
5|09
12
1|12

4)5 5 1
1 6 3¼
105 1 10½
106 8 1¾ 5th quar. amt.
5
5|32 0 8¾
20
6|40
12
4|88
4
3|55

4)5 6 4¾
1 6 7
106 8 1¾
107 14 8¾ 6th qr.
5
5|38 13 7¼
20
7|73
12
8|83
4
3|35

4)5 7 8¾
1 6 11
107 14 8¾
109 1 7¾ 7th quar. amt.
5
5|45 8 2¾
20
9|08
12
1|98
4
3|95

4)5 9 0¾
1 7 3
109 1 7¾
Anſ. 110 8 10¾ 8th quar. amt.

(5)

(5)

£.
450
4
18|00
450
468 1ſt year's amount.
4
18|72
20
14|40
12
4|80
4
3|20

£. s. d.
468 0 0
18 14 4¾
486 14 4¾ 2d year's amt.
4
19|46 17 7
20
9|37
12
4|51
4
2|04

486 14 4¾
19 9 4½
506 3 9¼ 3d year's amt.
4
20|24 15 1
20
4|95
12
11|41
4
1|64

506 3 9¼
20 4 11¼
526 8 8½ 4th year's amt.
4
21|05 14 10
20
1|14
12
1|78
4
3|12

526 8 8½
21 1 1¼
547 9 10¼ 5th yrs. amt.
450 0 0 principal
Anſ. 97 9 10¼ compound int.

EQUATION

EQUATION OF PAYMENTS.

(1)

£. £.
100 100
4 6
400 600
400
2|00)10|00
Ans. 5 months

(2)

200×0= 200
600×4= 2400
200×6= 1200
1000)3|800
Ans. $3\frac{4}{5}$ months

(3)

£. mo. £.
100×2= 200
80×5= 400
60×7= 420
24|0 { 6)102|0
{ 4) 17
Ans. $4\frac{1}{4}$ months

(4)

£. mo. £.
100× 2= 200
200× 4= 800
300× 6=1800
100×12=1200
7|00)40|00
Ans. $5\frac{5}{7}$ months

(5)

£. mo. £.
100× 4= 400
200× 5=1000
600×12=7200
9|00)86|00
Ans. $9\frac{5}{9}$ months

(6)

£.
3)1200
400×3=1200
400×4=1600
400×8=3200
12|00)60|00
Ans. 5 months

BARTER.

(1)

```
lb.  s.    lb.
1 :  2 ::  30
            2
       ------
       20)60
       ------
       £. 3
```

```
d.  lb.   £.
6 : 1 ::  3
         20
        ---
         60
         12
       -----
       6)720
       -----
        120 Ans.
```

(2)

```
lb.  d.    lb.
1 :  6 ::  120
             6
        -------
        12)720
        -------
         20)60
        -------
          £.3
```

```
s.  lb.   £.
2 : 1 ::  3
         20
        ---
       2)60
        ---
     lb. 30 Ans.
```

(3)

```
lb.  s.   cwt.
1 :  2 :: 2
        112
        ---
        224
          2
     ------
 2|0)44|8
     ------
  £.22 8
```

```
s.  lb.   £. s.
8 : 1 ::  22 8
          20
        -----
        8)448
        -----
 Ans. 56 lbs. of tea
```

(4)

(4)

lb. s. lb.
1 : 8 :: 56
8
2|0)44|8
£. 22 8

s. lb. £. s.
2 : 1 :: 22 8
20
2)448
Anſ. 224 lb. of coffee

(5)

yd. s. yds.
1 : 5 :: 252
5
20)1260
£. 63

hhd. £. gal.
6 : 63 :: 1
63 20
378)1260(3s. 4d. Anſ.
1134
.126
12
378)1512(4d.
1512

(6)

gal. s. d. hhd.
1 : 3 4 :: 6
12 63
40 378
40
12)15120
2|0)126|0
£. 63

yds. £. yd.
252 : 63 :: 1
20
252)1260(5s. Anſ.
1260

(7)

s. d. s. s. d.
8 4 : 10 :: 1 8
12 12
100 20
10
1|00)2|00
Anſ. 2s. per lb.

(8)

s. d. s. s. d.
1 8 : 2 :: 8 4
12 12
20 100
2
2|0)20|0
Anſ. 10s. per yard

(9)

(9)

C. *s.* *cwt.*
1 : 30 :: 82
30
2|0)246|0
123 val of A's cheeſe
—20 ready money
£. 103

d. *lb.* *£.*
5 : 1 :: 103
20
2060
12
5)24720
28 { 4)4944
7)1236
4) 176 4 } 16lb.
Anſ. *Cwt.* 44 0 16 of raiſins

(10)

lb. *d.* *cwt.* *qr.* *lb.*
1 : 5 :: 44 0 16
4
176
4×7=28
704
7
4944
5
12)24720
2|0)206|0
103 val. of B's raiſins
+ 20 ready money
£. 123

s. *C.* *£.*
30 : 1 :: 123
20
3|0)246|0
Anſ. 82 cwt. of cheeſe

LOSS AND GAIN.

(1)

C. s. C.
1 : 30 :: 4
4
2|0)12|0
£. 6 what bought for

lb. d. C.
1 : $4\frac{1}{2}$ :: 4
4 4
18 16
28
448
18
4)8064
12)2016
2|0)16|8
£.8 8 what ſold for
6 0 bought for
£. 2 8 gained thereby

(2) £.
100
+ 10
£.
100 : 110 :: 30
20 30
2000 3300
20
2|000)66|000
Anſ. 33s. per cent.

(3)
per cent. £. s. d.
10 = $\frac{1}{10}$) 1 13 0
0 3 $3\frac{1}{2}$ $\frac{4}{10}$
£. 1 9 $8\frac{1}{4}$ $\frac{6}{10}$ Anſ.

(4)

```
(4)     £.
        100
        −15
        ———          s. d.
 100  :  85   ::   6 8
  20     20        12
 ———    ————      ———
2000    1700       80
  12      80
 ———————————
24|000)136|000(5s. 8d. Anſ.
       120
       ———
       .16
        12
       ———
    24)192(8d.
       192
       ———
```

```
(5)          100
            +15
 £.         ————
 100  :     115  ::  6 8
  20         20      12
 ————       ————    ————
 2000       2300     80
   12         80
 ————       —————
24|000)184|000(7s. 8d. Anſ.
       168
       ———
       .16
        12
       ———
    24)192(8d.
       192
       ———
```

```
          £.          (6)
          100
         + 10
 £.       ———          £.  s.
 100  :   110   ::     10  10
  20                   20
 ———                   ———
2000                   210
                       110
                    ————————
            2|000)231|100
                  ————————
                £. 11|11
                      20
                    ————
                  2)22|0
                    ————
                  s. 11
```

```
lb.     £.  s.       lb.
112  :  11  11   ::   1
        20
       ————
112)231(2s. 0¾d. Anſ.
    224
    ———
    ..7
     12
    ———
     84
      4
    ———
112)336 3qr.
    336
    ———
```

lb. s. d. lb.
1 : 2 0¾ :: 112
12
24
4
99
112
198
1089
4)11088
12)2772
2|0)23|1
£. 11 11

(7)

£. s. £. s. £.
10 10 : 11 11 :: 100
20 20 20
210 231 2000
2000
2|0
210)462000(220|0
420
110
420 —100
420
£.10 Anſ.

(8)

s. d.
6 6
—5 0
s. £.
5 : 1 6 :: 100
12 20
18 2000
18
5)36000
12)7200
2|0)60|0
Anſ. 30 per cent.

(9)

s. d. £.
2 6=⅛)100
Anſ. 12 10 per ct.

SINGLE

SINGLE FELLOWSHIP.

(1)

£.
40
60
£. £.
100 : 50 :: 40
40
1|00)20|00
£. 20 A's ſhare

£. £. £.
100 : 50 :: 60
60
1|00)30|00
30 B's ſhare
20 A's ſhare
£. 50 proof

(2)

£.
300
700
1000 : 160 :: 300
300
1|000)48|000
£. 48 A's ſhare

£. £. £.
1000 : 160 :: 700
700
1|000)112|000
112 B's ſhare
48 A's ſhare
£. 160 proof

(3)

£.
460
760
£. £.
1220 : 250 :: 460
460
15000
1000
£. s. d.
1220)115000(94 5 $2\frac{3}{4}$ $\frac{980}{1220}$
10980
..5200
4880
.320
20
1220)6400(5*s.*
6100
.300
12
1220)3600(2*d.*
2440
.1160
4
1220)4640(3*qrs.*
3660
.980

£. £. £.
1220 : 250 :: 760
760
15000
1750
1220)190000(155 14 9 $\frac{240}{1220}$
1220
.6800
6100
.7000
6100
.900
20
1220)18000(14*s.*
1220
.5800
4880
.920
12
1220)11040(9*d.*
10980
...60
4
240

£.	s.	d.		
155	14	9 $\frac{240}{1220}$		B's ſhare
94	5	$2\frac{3}{4}$ $\frac{980}{1220}$		A's ſhare
£. 250	0	0		proof

(4)

£.
50
60
70

£.
180 : 40 :: 50
50

£. s. d.
18)200|0(11 2 $2\frac{1}{2}$ $\frac{12}{18}$ A's ſhare
18

20
18

.2
20

18)40(2*s.*
36

.4
12

18)48(2*d.*
36

12
4

18)48(2*qr.*
36

12

180 : 40 :: 60
60

18)240|0(13 6 8
18

.60
54

.6
20

18)120(6*s.*
108

.12
12

18)144(8*d.*
144

£. £. £.
180 : 40 :: 70
70

£. *s.* *d.*
18)280|0(15 11 $1\frac{1}{4}$ $\frac{6}{18}$
18

.100
90

10
20

18)200(11*s.*
18

20
18

.2
12

18)24(1*d.*
18

. 6
4

18)24(1*qr.*
18

.6

£.	*s.*	*d.*	
11	2	$2\frac{1}{2}$ $\frac{12}{18}$	A's ſhare
13	6	8	B's ſhare
15	11	$1\frac{1}{4}$ $\frac{6}{18}$	C's ſhare
£. 40	0	0	proof

(5)

(5)

£.
120
140
200
260

720 : 340 :: 120
120

72|0)4080|0(56 13 4 A's debt
360

.480
432

.48
20

72)960(13*s.*
72

.240
216

.24
12

72)288(4*d.*
288

720 : 340 :: 140
140

72|0)4760|0(66 2 $2\frac{1}{2}\frac{48}{72}$
432

.440
432

..8
20

72)160(2*s.*
144

.16
12

72)192(2*d.*
144

.48
4

72)192(2*qrs.*
144

.48

£. £. £.
720 : 340 :: 200
200

72|0)6800|0(94 8 $10\frac{1}{2}\frac{48}{72}$

£. £. £.
720 : 340 :: 260
260

20400
680

72|0)8840|0(122 15 $6\frac{1}{2}\frac{48}{72}$

£.	*s.*	*d.*	
122	15	$6\frac{1}{2}\frac{48}{72}$	D's debt
94	8	$10\frac{1}{2}\frac{48}{72}$	C's debt
66	2	$2\frac{1}{2}\frac{48}{72}$	B's debt
56	13	4	A's debt
340	0	0	proof

(6)

```
  £.    s. d.
 1620   4  2
 2500   2  6
 4342   1  4
 4298  10  8
-------------         £.       £.    s. d.
12760  18  8  :  2000  ::  1620   4  2
   20                        20
------                    ------
255298                    32404
    12                       12
-------                  -------
3062624                  388850
                           2000
                        ---------
              3062624)777700000(253  18  7¾ 834400/3062624
                      6125248           [A.'s ſhare
                      --------
                      16517520
                      15313120
                      --------
                     .12044000
                       9187872
                      ---------
                      .2856128
                            20
                      --------
               3062624)57122560(18s.
                       3062624
                       --------
                       26496320
                       24500992
                       --------
                       .1995328
                             12
                       --------
               3062624)23943936(7d.
                       21438368
                       --------
                       .2505568
                              4
                       --------
               3062624)10022272(3qr.
                        9187872
                       --------
                        .834400
```

d. £. £. s. d.
3062624 : 2000 : : 2500 2 6
20

50002
12

600030
2000

£. s. d.
3062624)1200060000(391 16 $9\frac{1}{2}\frac{2580416}{3062624}$
9187872 [B's ſhare.

28127280
27563616

. . 5636640
3062624

2574016
20

3062624)51480320(16*s.*
3062624

20854080
18375744

. 2478336
12

3062624)29740032(9*d.*
27563616

. 2176416
4

3062624)8705664(2*qr.*
6125248

2580416

```
     d.          £.          £.    s.  d.
3062624  :  2000  ::  4342   1   4
                                20
                           ———————
                           86841
                                12
                           ———————
                        1042096
                            2000
                  ———————————       £.    s.   d.
3062624)2084192000(680  10  5¾ 2872928/3062624
             18375744             [C's ſhare
             ————————
            .24661760
             24500992
             ————————
            ..1607680
                   20
             ————————
3062624)32153600(10s.
         3062624
         ———————
         .1527360
               12
         ———————
3062624)18328520(5d.
         15313120
         ————————
         .3015200
                4
         ————————
3062624)12060800(3 qr.
          9187872
          ———————
          2872928
```

d. £. £. s. d.
3062624 : 2000 : : 4298 10 8
20

85970
12

1031648
2000

3062624)2063296000(673 14 $0\frac{1}{4}\frac{2900128}{3062624}$ [D's ſhare.
18375744

.22572160
21438368

.11337920
9187872

2150048
20

3062624)43000960(14*s.*
3062624

12374720
12250496

..124224
12

1490688
4

3062624)5962752(1 *qr.*
3062624

2900128

£.	s.	d.	
253	18	$7\frac{3}{4}\frac{834400}{3062624}$	A's ſhare of the loſs
391	16	$9\frac{1}{2}\frac{2580416}{3062624}$	B's ditto
680	10	$5\frac{3}{4}\frac{2872928}{3062624}$	C's ditto
673	14	$0\frac{1}{4}\frac{2900128}{3062624}$	D's ditto
£.2000	0	0	proof

(7)

3)2280 4)2280 5)2280 6)2280

760 570 456 380

760
570
456
386

2166 : 2280 : : 760
760

136800
15960

2166)1732800(800 A's part
17328

.....00

2166 : 2280 : : 570
570

159600
11400

2166)1299600(600 B's part
12996

....00

2166 : 2280 : : 456
456

13680
11400
9120

2166)1039680(480*l.* C's part
8664

17328
17328

.....0

2166 : 2280 : : 380
380

182400
6840

2166)866400(400*l.* D's part
8664

....00

£.
800
600
480
400

£.2280 proof

(8)

men.
45
60
64
72
80

321 : 24075 : : 45 (the column heads are £. and M.)
45
120375
96300
321)1083375(3375*l.* 1ſt party's [ſhare
963
1203
963
2407
2247
. 1605
1605

M. *£.* *M.*
321 : 24075 : : 72
72
48150
168525
321)1733400(5400*l.* 4th party's [ſhare
1605
. 1284
1284

M. *£.* *M.*
321 : 24075 : : 60
60
321)1444500(4500*l.* 2d party's [ſhare
1284
. 1605
1605

321 : 24075 : : 64
64
96300
144450
321)1540800(4800*l.* third party's ſhare
1284
. 2568
2568

M. *£.* *M.*
321 : 24075 : : 80
80
321)1926000(6000*l.* 5th party's [ſhare.
1926

£.
3375
4500
4800
5400
6000
. 24075 proof

DOUBLE

DOUBLE FELLOWSHIP.

(1)

£. £.
40 20
3 4
120 80
80
200 : 10 :: 120
120
2|00)12|00
£. 6 A's ſhare

200 : 10 :: 80
80
2|00)8|00
4 B's ſhare
6 A's ſhare
£. 10 proof

(2)

120×4=480
230×3=690
360×2=720
1890 : 120 :: 480
120
189|0)5760|0(30 9 $6\frac{1}{4}\frac{27}{189}$ A's ſhare
5670
90
20
189)1800(9*s.*
1701
99
12
189)1188(6*d.*
1134
54
4
189)216($\frac{1}{4}$*q.*
189
27

1890 : 120 :: 690
120

1890)82800(43*l.* 16*s.* $2\frac{1}{4}$*d.* $\frac{27}{189}$ B's ſhare
7560

.7200
5670

1530
20

1890)30600(16*s.*
1890

11700
11340

..360
12

1890)4320(2*d.*
3780

.540
4

1890)2160(1*qr.*
1890

.270

1890 : 120 :: 720
120

£. s. d.
1890)86400(45 14 $3\frac{1}{4}$ $\frac{135}{189}$
7560 [C's ſhare

10800
9450

1350
20

1890)27000(14*s.*
1890

.8100
7560

.540
12

1890)6480(3*d.*
5670

.810
4

1890)3240(1*qr.*
1890

1350

	£.	s.	d.	
	30	9	$6\frac{1}{4}$ $\frac{27}{189}$	
	43	16	$2\frac{1}{4}$ $\frac{27}{189}$	
	45	14	$3\frac{1}{4}$ $\frac{135}{189}$	
£.	120	0	0	proof

(3)

(3)

oxen	6	8	10	12	72
days	12	14	16	20	112
					160
ſum	72	112	160	240	240
				ſum of the products	584

584 : 14 :: 72
14
£. s. d.
584)1008(1 14 6 $\frac{576}{584}$ A's ſhare
584
424
20
584)8480(14*s.*
584
2640
2336
304
12
584)3648(6*d.*
3504
144
4
576

584 : 14 :: 112
112
£. s. d.
584)1568(2 13 8$\frac{1}{4}$ $\frac{312}{584}$ B's ſhare
1168
400
20
584)8000(13*s.*
584
2160
1752
408
12
584)4896(8*d.*
4672
224
4
584)896(1*qr.*
584
312

584 : 14 :: 160
14
£. s. d.
584)2240(3 16 $8\frac{1}{2}$ $\frac{112}{384}$ C's ſhare
1752
.488
20
584)9760(16*s.*
584
3920
3504
.416
12
584)4992(8*d.*
4672
.320
4
584)1280(2*qr.*
1168
.112

£.	s.	d.	
1	14	6	$\frac{576}{384}$
2	13	$8\frac{1}{4}$	$\frac{312}{384}$
3	16	$8\frac{1}{2}$	$\frac{112}{384}$
5	15	$0\frac{3}{4}$	$\frac{168}{384}$
£.14	0	0	proof

584 : 14 :: 240
240
£. s. d.
584)3360(5 15 $0\frac{3}{4}$ $\frac{168}{384}$ D's ſha.
2920
.440
20
584)8800(15*s.*
584
2960
2920
..40
12
480
4
584)1920(3*qr.*
1752
.168

(4)

£. *mo.* £. *mo. products.*
100×8= 800=A's product
80×5+100×3= 700=B's product
176×4+136×4=1248=C's product
230×6=1380=D's product

4128 = ſum of the products

4128 : 200 : 800
800

£. *s.* *d*
4128)160000(38 15 $2\frac{1}{4}\frac{1248}{4128}$ A's gain
12384

.36160
33024

. 3136
20

4128)62720(15*s.*
4128

21440
20640

..800
12

4128)9600(2*d.*
8256

1344
4

4128)5376(1*qr.*
4128

1248

4128 : 200 :: 700
200

£. s. d.
4128)140000(33 18 $3\frac{1}{2}\frac{576}{4128}$ B's gain
12384

16160
12384

3776
20

4128)75520(18*s.*
4128

34240
33024

1216
12

4128)14592(3*d.*
12384

2208
4

4128)8832(2*qr.*
8256

576

4128 : 200 :: 1248
200

£. s. d.
4128)249600(60 9 $3\frac{1}{2}\frac{2112}{4128}$
[C's gain
24768

1920
20

4128)38400(9*s.*
37152

1248
12

4128)14976(3*d.*
12384

2592
4

4128)10368(2*qr.*
8256

2112

4128 : 200 : 1380

200

£. s. d.

4128)276000(66 17 $2\frac{1}{2}\frac{192}{4128}$ D's gain.

24768

.28320

24768

.3552

20

4128)71040(17*s.*

4128

29760

28896

..864

12

4128)10368(2*d.*

8256

2112

4

4128)8448(2*qr.*

8256

.192

£.	s.	d.	
58	15	$2\frac{1}{4}\frac{1248}{4128}$	
33	18	$3\frac{1}{2}\frac{576}{4128}$	
60	9	$3\frac{1}{2}\frac{2112}{4128}$	
66	17	$2\frac{1}{2}\frac{192}{4128}$	
£.200	0	0	proof

(5)

mo. £. mo. £. mo. £.
8)200 12)168 6)240
25 14 40

25
14
40

79 : 2000 :: 25
25
£. s. d.
79)50000(632 18 $2\frac{1}{2}\,\frac{74}{79}$ A's ſtock
474
·260
237
·230
158
·72
20
79)1440(18*s.*
79
·650
632
·18
12
79)216(2*d.*
158
·58
4
79)232(2qr.
158
·74

79 : 2000 :: 14
14
£. s. d.
79)28000(354 8 $7\frac{1}{4}\,\frac{13}{79}$ B's [ſtock
237
·430
395
·350
316
·34
20
79)680(8*s.*
632
·48
12
79)576(7*d.*
553
·23
4
79)92(1qr.
79
13

79 : 2000 :: 40

40

£. s. d.

79)80000(1012 13 $1\frac{1}{4}\frac{71}{79}$ C's ſtock

79

100

79

210

158

·52

20

79)1040(13s.

79

250

237

·13

12

79)156(1d.

79

·77

4

79)308(3qr.

237

·71

£.	s.	d.	
632	18	$2\frac{1}{2}\frac{74}{79}$	
354	8	$7\frac{1}{4}\frac{13}{79}$	
1012	13	$1\frac{1}{4}\frac{71}{79}$	
£. 2000	0	0	proof

ALLIGATION

ALLIGATION MEDIAL.

(1)

Buſh. *s.* *s.*
16 × 6=96
8 × 4=32
s. *d.*
24) 128(5 4 Anſ.
120
..8
12
24)96(4*d.*
96

s. *d.*
5 4
4×6=24
1 1 4
6
£. 6 8 0=128*d.* proof *

(2)

lb. *s.*
2×4= 8
2×5=10
3×8=24
7) 42
£.6*s.* per lb.

(3)

gal. *s.* *d.* *s.*
36×6 6=234
12×5 0= 60
12×3 0= 36
60 6|0)33|0
Anſ. 5 6*d.* per gal.

---

* Theſe examples are proved by Alligation Alternate; but may be proved by finding the value of the whole mixture at the mean price, which muſt be equal to the total value of the ſeveral ingredients, as in example 1.

(4)

(4)

lb. *C.* *C.*
3×18=54
1×20=20
1×22=22
3×24=72
8) 168

Anſ. 21 caracts fine

(5)

bu. *s.* *d.* *s.*
12×6 0=72
6×5 0=30
6×4 6=27
18×3 6=63
24×3 0=72
66) 264(4*s.*
264 [anſ.

(6)

gal. *d.* *d.*
4×16=64
4×12=48
3× 9=27
1× 5= 5
12× 4=48
24) 192(8*d.*
192 [anſ.

ALLIGATION ALTERNATE.

(1)

$$\begin{array}{cccl} & d. & & bush. \\ 64 & \left\{\begin{array}{c}72\\48\end{array}\right\} & \left\}\begin{array}{l}16\text{ wheat}\\8\text{ rye}\end{array}\right\} & \text{Anſ.}\end{array}$$

72×16=1152
48× 8= 384
d.
24) 1536(64 proof *
144
..96
96

(2)

$$\begin{array}{ccccl} & s & & lb. \quad s. & \\ 6 & \left\{\begin{array}{c}4\\5\\8\end{array}\right\} & \left\}\begin{array}{l}2 = 2\text{ at }4\\2 = 2\text{ at }5\\1+2=3\text{ at }8\end{array}\right\} & & \text{Anſwer}\end{array}$$

(3)

$$\begin{array}{ccccl} & d & & gal. \quad s.\ d. & \\ 66 & \left\{\begin{array}{c}78\\60\\36\end{array}\right\} & \left\}\begin{array}{r}30+6=36\text{ at }6\ 6\\12\text{ at }5\ 0\\12\text{ at }3\ 0\end{array}\right\} & & \text{per gallon Anſwer}\end{array}$$

---

* Theſe examples are proved by Alligation Medial; but may be proved as above. See firſt example.

(4)

$$21\left\{\begin{array}{l}18\\20\\22\\24\end{array}\right\}\quad\begin{array}{rcl}\text{car.}&&\text{car.}\\3&\text{at}&18\\1&\text{at}&20\\1&\text{at}&22\\3&\text{at}&24\end{array}\left.\vphantom{\begin{array}{l}1\\1\\1\\1\end{array}}\right\}\text{caracts fine, anſwer}$$

(5

$$48\left\{\begin{array}{l}72\\60\\54\\42\\36\end{array}\right\}\quad\begin{array}{rcrr}B.&&s.&d.\\12&\text{at}&6&0\\6&\text{at}&5&0\\6&\text{at}&4&6\\6+12=18&\text{at}&3&6\\24&\text{at}&3&0\end{array}\left.\vphantom{\begin{array}{l}1\\1\\1\\1\\1\end{array}}\right\}\text{per b. Anſ.}$$

(6)

$$\begin{array}{l}d.\\8\left\{\begin{array}{l}16\\12\\9\\5\\4\end{array}\right.\end{array}\quad\begin{array}{rcr}gal.&&d.\\4&\text{at}&16\\4&\text{at}&12\\3&\text{at}&9\\1&\text{at}&5\\4+8=12&\text{at}&4\end{array}\left.\vphantom{\begin{array}{l}1\\1\\1\\1\\1\end{array}}\right\}\text{per gallon, Anſwer}$$

Queſtions of this ſort admit of a great variety of anſwers; for as many different ways as you can link a greater quantity than the mean to a leſs, ſo many different anſwers will be obtained by the rule, and numbers in the ſame proportion to the differences, will likewiſe anſwer the queſtion ad infinitum; for which reaſon they are called by algebraiſts indeterminate, or unlimited, problems; and by an analytical proceſs, theorems may be raiſed that will give all the poſſible anſwers to theſe queſtions.

ALLIGATION PARTIAL.

(1)

$$\begin{array}{rcccc} & d. & d. & bu. & \\ \text{mean} & 64 & \left\{\begin{array}{c}72\\48\end{array}\right\} & \begin{array}{l}16\ \text{wheat}\\8\ \text{rye}\end{array} & \left.\vphantom{\begin{array}{c}1\\1\end{array}}\right\}\ \text{Anſ.}^{*}\end{array}$$

(2)

$$\begin{array}{rccccc} & s. & & dif. & & s. \\ \begin{array}{c}\text{mean}\\6\end{array} & \left\{\begin{array}{c}8\\5\\4\end{array}\right\} & 2+1= & \begin{array}{r}3\\2\\2\end{array} & \begin{array}{c}\text{at}\\\text{at}\\\text{at}\end{array} & \left.\begin{array}{c}8\\5\\4\end{array}\right\}\ \text{1ſt Anſ.}\end{array}$$

$$\begin{array}{l}\text{Then as } 3 : 6 :: 2\\ \qquad\qquad\ \ 2\\ \hline \qquad\ 3)12\\ \hline\end{array}$$

Anſwer 4lb. of each of the other ſorts

$$\begin{array}{rccl} & d. & & \text{diff.}\\ \begin{array}{c}d.\\66\end{array} & \left\{\begin{array}{c}78\\60\\36\end{array}\right\} & 30+6= & \begin{array}{r}36\\12\\12\end{array}\end{array}$$

(3)

$$\begin{array}{l}\text{As } 36 : 18 :: 12\\ \qquad\qquad\ 12\\ \hline 36\left\{\begin{array}{l}6)216\\ \hline 6)\ 36\end{array}\right.\\ \hline\end{array}$$

Anſ. 6 gal. of the other two ſorts

---

* When two kinds of things only are given to be mixed, the rule of alligation will give but one anſwer. If three kinds of things are given to be mixed, it will give but one anſwer; but all numbers in the ſame proportion between themſelves and the numbers which compoſe that anſwer, will alſo ſatisfy the queſtion; therefore all the examples in this rule are proved by Alligation Medial, they being in the ſame proportion with thoſe numbers.

(4)

$$21\left\{\begin{array}{l}18\\20\\22\\24\end{array}\right\}\begin{array}{l}3\\1\\1\\3\end{array}\qquad \text{As } \begin{array}{r}3 : 6 :: 1\\1\\\hline 3)6\\\hline 2\end{array}\qquad\qquad \begin{array}{r}3 : 6 :: 3\\3\\\hline 3)18\\\hline 6\end{array}$$

Anſ. 2lb. of 20 and 22, and 6lb. of 24 caracts fine.

(5)

$$48\left\{\begin{array}{l}72\\60\\54\\42\\36\end{array}\right\}\begin{array}{r}12\\6\\6\\6+12=18\\24\end{array}$$

$$\begin{array}{ccc}b. & & b.\\6 & : & 12\end{array} :: \left\{\begin{array}{rcrcrr}b. & & b. & & s. & d.\\6 & : & 12 & \text{at} & 5 & 0\\6 & : & 12 & \text{at} & 4 & 6\\18 & : & 36 & \text{at} & 3 & 6\\24 & : & 48 & \text{at} & 3 & 0\end{array}\right\}\text{per buſhel, Anſ.}$$

(6)

$$8\left\{\begin{array}{l}16\\12\\9\\5\\4\end{array}\right\}\begin{array}{r}4\\4\\3\\1\\4+8=12\end{array}$$

$$\begin{array}{ccc}g. & & g.\\4 & : & 8\end{array} :: \left\{\begin{array}{rcrcr}g. & & g. & & d.\\4 & : & 8 & \text{at} & 12\\3 & : & 6 & \text{at} & 9\\1 & : & 2 & \text{at} & 5\\12 & : & 24 & \text{at} & 4\end{array}\right\}\text{per gal. Anſwer}$$

ALLIGATION TOTAL.

(1)

$$3\left\{\begin{matrix}4\\0\end{matrix}\right\}\begin{matrix}3\\1\end{matrix}\qquad \overset{g.}{4} : \overset{g.}{16} :: \left\{\begin{matrix}\overset{g.}{3} & : & \overset{g.}{12} & \text{wine}\\ 1 & : & 4 & \text{water}\end{matrix}\right.$$

ſum 4 * proof 16 gal.

Or, As $\overset{g.}{16} : \overset{s.}{48} :: \overset{g.}{1} : \overset{s.}{3}$ mean price, given proof

(2)

$$\overset{d.}{6}\left\{\begin{matrix}\overset{d.}{3}\\4\\6\\10\end{matrix}\right.\qquad\begin{array}{r}\text{diff.}\\4\\4\\4\\0+2+3=5\\\hline\text{ſum }17\end{array}$$

$$\begin{matrix}\text{ſum} & \text{lb.}\\17 : & 112\end{matrix} :: \left\{\begin{array}{ccccc}\text{diff.} & & \text{lb.} & & \text{d.}\\4 & : & 26\frac{6}{7} & \text{at} & 3\\4 & : & 26\frac{6}{7} & \text{at} & 4\\4 & : & 26\frac{6}{7} & \text{at} & 6\\5 & : & 32\frac{16}{17} & \text{at} & 10\end{array}\right\}\text{per lb. Anſ.}$$

112lb. proof.

---

* The proof is had by finding the value of the whole mixture at the mean rate; which muſt be equal to the total value of the ſeveral ſimples, or if the ſum of the ſeveral particulars agree with the given ſum, the work is right.

Several authors have given demonſtrations of this rule, but thoſe publiſhed by Dr. Hutton, in his arithmetic, are the moſt intelligible of any I have yet ſeen.

(3)

$$19\left\{\begin{array}{c}22\\20\\18\\17\\14\end{array}\right\}\begin{array}{r}5\\2+1=3\\1\\1\\3\\\hline \text{ſum } 13\end{array}$$

$$\begin{array}{cc}\text{ſum} & \text{oz.}\\13 & : 200\end{array} :: \left\{\begin{array}{rcl}\text{diff.} & \text{oz.} & \text{car. fine}\\5 & : & 76\tfrac{12}{13} \text{ of } 22\\3 & : & 46\tfrac{2}{13} \text{ of } 20\\1 & : & 15\tfrac{5}{13} \text{ of } 18\\1 & : & 15\tfrac{5}{13} \text{ of } 17\\3 & : & 46\tfrac{2}{13} \text{ of } 14\end{array}\right\} \text{Anſwer}$$

proof 200 oz. of 19 car. fine

(4)

$$56\left\{\begin{array}{c}d.\\96\\72\\48\\24\end{array}\right\}\begin{array}{r}\\32\\8\\16\\40\\\hline \text{ſum } 96\end{array}\qquad\begin{array}{cc}\text{ſum} & \text{buſh.}\\96 & : 240\end{array} :: \left\{\begin{array}{rcl}\text{diff.} & & \text{buſh.}\\32 & : & 80 \text{ wheat}\\8 & : & 20 \text{ rye}\\16 & : & 40 \text{ barley}\\40 & : & 100 \text{ oats}\\\hline & & \text{buſh. } 240 \text{ proof}\end{array}\right\} \text{Anſ.}$$

(5)

$$16\left\{\begin{array}{c}24\\21\\19\\0\end{array}\right\}\begin{array}{r}16\\16\\16\\3+5+8=16\\\hline 64\end{array}\qquad\begin{array}{cc}\text{ſum} & \text{oz.}\\64 & : 190 :: 16\\ & 16\\\hline 64\left\{\begin{array}{l}8)3040\\8)\ 380\end{array}\right. & \\\hline\end{array}$$

Anſ. 47½ oz. of each ſort
4

190 oz. proof

EXCHANGE.

EXCHANGE.

cr. *d.* (1) *cr.*
1 : 30 :: 1000
30
12)30000
2|0)250|0
£. 125 Anſ.

(2) *d.* *cr.* £.
30 : 1 :: 125
20
2500
12
3|0)3000|0
Anſ. 1000 crowns.

(3)
C. *d.* *Liv. ſol. den.*
1 : 31 :: 280 13 4
3 20
3 5613
20 12
60 67360
12 31
720 67360
202080
72|0 { 6)208816|0
12)34802 4
12)2900 2 } 16 = $\frac{2}{9}$
2|0)241|1 8*d.*
£. 12 1 $8\frac{2}{9}$ Anſ.

The courſe of exchange is ſuch a variable ſum of the money of one place as is propoſed to be given for a certain conſtant ſum of that of another.

The par of exchange is that quantity of the money of one country which is intrinſically equal to a certain quantity of the money of another; and it is one of theſe that is the conſtant ſum to which the courſe is compared.

The money in the banks of foreign places is finer than that which is current in thoſe places; and the difference between any ſum as it is valued in the one or the other is called the agio.

```
 d.   c.     £. s. d.       (4)
 31 : 1  ::  12 1 8 2/9
  9   3      20
 ---  -     ---
 279  3     241
             12
           ----
           2900
              9
           ----
          26102
              3
          -----  L. sol. den.
279)78306(280 13 4 an.
    558
    ---
    2250
    2232
    ----
    ..186
       20
    -----
279)3720(13
    279
    ---
    .930
     837
     ---
     .93
      12
    -----
279)1116(4
    1116
    ----

                        (5)
        cr.  s. d.        cr. liv. sol. d.
        1  : 4  2  ::   2148  2   4   6
        3    12            3
       ---  ---         -----
        3    50         6446
       20                 20
       ---              ------
       60              128924
       12                  12
       ---             -------
       720             1547094
                            50
                       ---------
            { 6)7735470|0
       72|0 {
            { 12)1289245  0 }
                            } 6/72
              12)107437   1 }
              -------
              2|0)8951|3  1
              ----
            £. 447  13  1 1/12 ans.
            -------------------
```

(6)

```
                              (6)
     c.   liv. ſol. den.    £.     s. d.       c.
   2148    2    4    6  :  447    13 1 1/12  ::  1
      3                     20                   3
   ----                   ----                ----
   6446                   8953                   3
     20                     12                  20
   ----                 ------                ----
 128924                 107437                  60
     12                     12                  12
-------                -------                ----
1547094                1289245                 720
                           720
                      --------
                      25784900
                      9024715
                    ----------  12)
       1547094)928256400(600
                9282564      ----
               ---------   12)50
                      00    ----
                            4s. 2d. anſ.
                            --------
```

S P A I N.

```
       (1)
d.  P.      £.
50 : 1 :: 1440
            20
         -----
         28800
            12
         -----
   5|0)34560|0
   Anſ. 6912 piaſtres
```

```
      (2)
P.  d.     P.
1 : 50 :: 6912
             50
        -------
     12)345600
     2|0)2880|0
   £. 1440 Anſ.
```

Note. In Genoa and Leghorn they keep their accounts in livres, ſols, and deniers as in France, but exchange by the piaſtre as in Spain, which in Genoa is accounted five livres, and at Leghorn ſix. At Venice accounts are kept by ſome in the ſame manner, by others in ducats and groſs, reckoning 24 groſs to a ducat, upon which they exchange, and whoſe par is accounted 4*s.* 6*d.* ſterling.

(3)

(3)

Pia. *d.* *pia.* *ri.* *mar.*
1 : 48 :: 2600 6 20
8 8

8 20806
34 34

272 83244
62418

707424
4×12=48

2829696
12

12)
272)33956352(124839
272

.675 2|0)1040|3 3^d.
544

£.520 3 3 36/68 Anſ.

1316
1088

.2283
.2176

.1075
.816

.2592
2448

.144

(4)

(4)

```
  d.  pia.      £.  s. d.
  48 : 1  ::  520  3 3 36/68
  68           20
 ---         -----
 384        10403
 288           12
----       ------
3264       124839
               68
           ------
           998748
          749034
          ------- Pia. ri. m.
   3264)8489088(2600 6 20
        6528
        -----
        19610
        19584
        -----
        ...2688
              8
         ------
   3264)21504(6 rials
        19584
        -----
        .1920
           34
        -----
         7680
         5760
        -----
   3264)65280(20 marv.
        6528
        ----
        ....0
```

(5)

```
Pia. ri. m.    £.  s. d.        p.
2600 6 20 : 520  3 3 36/68 :: 1
        8      20               8
   ------   -----              --
   20806    10403               8
      34       12              34
   ------  ------             ---
   83244   124839             272
  62418        68
  ------   ------
  707424   998748
          749034
          -------
          8489088
              272
         --------
         16978176
        59423616
       16978176
      ----------- 68)
707424)2309031936(3264
       2122272     ----
       -------     48d. ans.
       .1867599
        1414848
        -------
         4527513
         4244544
         -------
         .2829696
          2829696
          -------
```

PORTUGAL.

PORTUGAL.

(1)

s. *mil.* £.
5 : 1 :: 3656
20

5)73120

Anſ. 14624 *mil.*

(2)

mil. *s.* *mil.*
1 : 5 :: 14624
5

2|0)7312|0

£. 3656 Anſ.

(3)

d. *mi.* £. *s.* *d.*
64 : 1 :: 360 4 8
20

7204
12

mil. *rea.*
64)86456(1350 875 Anſ.
64

224
192

·325
320

··56
1000

64)56000(875
512

·480
448

·320
320

(4)

mil. *d.* *mil.* *reas*
1 : 64 :: 1350 875
1000

1350875
8×8=64
8

10807000
8

1|000)86456|000

12)86456

2|0)7204 8*d.*

£. 360 4 8 Anſ.

HOLLAND, FLANDERS, and GERMANY.

```
                              (2)
              gil.    gui.    guil. stiv.
              104  :  100  ::  110  12
               20               20
              ----             ----
              2080             2212
                                100
                               ------ gui. fl. gr. pen.
                          2080)221200(106 6  1  6 10/13
                               2080
                               ----
                                13200
                                12480
                                -----
                                  720
                                   20
                                 ----
                          2080)14400(6 fl.
                               12480
                               -----
                                1920
                                   2
                                ----
                          2080)3840(1 gr.
                               2080
                               ----
                               1760
                                  8
                               ----
                          2080)14080(6 pen.
                               12480
                               -----
                                1600
```

```
          (1)
gil.      gil.    gil.
105  :    100  ::  2982
                    100
             ------- guil.
     105)298200(2840An.
         210
         ---
          882
          840
          ---
           420
           420
           ---
             0
```

(3)

g. : g. :: g.
100 : 105 :: 2840
105
14200
28400
1|00)2982|00
2982 Anſ.

(4)

g. : g. :: g. *fl.* gr. p.
100 : 104 :: 106 6 1 $6\frac{10}{13}$
20 20
2000 2126
2 2
4000 4253
8 8
32000 34030
13 13
416000 442400
104
1769600
4424000
guil. fl.
4160|00)460096|00(110 12
4160
4409
4160
2496
20
4160)49920(12 *fl.*
4160
8320
8320

(5)

£
640
20
12800
12
4|0)15360|0
Anſ. 3840 *guil.*

(6)

```
     guilders
       3840
         40
     ------
12)153600
   ------
2|0)1280|0
    ------
Anſ.  640 Flem. Pounds
```

(7)

```
      £.   s.
      864  12
       20
     -----
     17292
        12
     -----  guil. ſtiv.
40)207504(5187  12 Anſ.
   200
   ---
    ..75
      40
     ---
     350
     320
     ---
     .304
      280
      ---
     2)24
       --
       12 ſtivers
```

(8)

```
   guil. ſtiv. d.
   5187  12=24
     40
   ------
12)207504
   ------
2|0)1729|2
    ------
£. 864  12 Anſ.
```

(9)

```
£.  £. s.     £.
1 : 1  14 :: 350
    20         34
    --        ----
    34        1400
              1050
              ----
        2|0)1190|0
            ------
(10)      £. 595   Anſ.
```

(10)

```
£.   s.  d.     £.  s.
1  : 33  6 ::  842  5
20   12         20
--   ---       -----
20   402       16845
                 402
               -----
               33690
              673800
              ------
         2|0)677169|0
             --------
          12)338584  ½
             ------
          2|0)2821|5  4
              ------
          £. 1410  15  4 ½ an.
```

(11)

s. £. £.
34 : 1 :: 595
20
£
34)11900(350 Anſ.
102
.170
170
...0

(12)

s. d. £. £ s. d.
33 6 : 1 :: 1410 15 $4\frac{1}{2}$
12 20
402 28215
4 12
1608 338584
4
£. s.
1608)1354338(842 5 An.
12864
..6793
6432
3618
3216
½ -.402
20
1608)8040(5s.
8040

(13)

s. £. flo. ft.
34 : 1 :: 5187 12
12 20
408 103752
2
£. s. d.
408)207504(508 11 $9\frac{3}{17}$
2040
..3504
3264
.240
20
408)4800(11s.
408
.720
408
312
12
408)3744(9d.
3672
..74

(14)

(14)

£. *s.* *d.* *flor.* *ſt.* £.
508 11 9$\frac{3}{7}$: 5187 12 :: 1
20 20 20

10171 103752 20
12 2 12

122061 207504 240
17 4080 17

2075040 16600320 4080
8300160

(12
2075040)846616320(408
8300160 —
34*s.* Anſ.
16600320
16600320

H A M B R O.

(1)

ſ.gr. £. *mks.*
32 : 1 :: 624
6 16

192 9984
2 2

384) 19968(52 Anſ.
1920

768
768

(2)

£. *ſ.gr.* £.
1 : 32 :: 52
52

64
160

1664 *ſols. groſ.*
6

16 { 4)9984 *ſols. lubs.*
4)2496

Anſ. 624 *marks*

(3)

ſ.gr. den. *£.* *mks. ſ.l.*
36 1 : 1 :: 1724 5
6 16

216 27589
2 2

£. s. d.
433 433)55178(127 8 7½ $\frac{258}{433}$ Anſwer
433

1187
866

3218
3031

.187
20

433)3740(8s
3464

.276
12

433)3312(7d
3031

.281
4

433)1124(½
866

258

```
£.  ſ.l. den.      £.  s.  d.
 1  :  36  1  ::  127  8  7½ 258/433
20      6          20
--     ---        ----
20     216  :  1  2548
12       2          12
---    ---       -----
240(   433       30583
  4                  4
---              ------
 960            122334
 433               433
----            -------
 2880           367002
2880           367002
3840          489336
-------       ---------
415680   :    52970622
                  +258
              ---------
              52970880
                   433
             ----------
             158912640
            158912640
           211883520
           ------------                (2
415680)22936391040(55178
       2078400                 ----------
       -------      16 { 4)27589
       .2152391        { 4) 6897   1 }
        2078400              ----      } 5 ſol.l.
        -------              1724  1 }
        ..739910
          415680       Anſ. 1724mks. 5ſol. l.
         -------
         3242304
         2909760
         -------
        .3325440
         3325440
        --------
```

VENICE.

(1)
d. pia. £.
50 : 1 :: 460
20
9200
12
5|0)11040|0
Anſ. 2208 Piaſters

(2) pia. d. pia.
1 : 50 :: 2208
50
12)110400
2|0)920|0
£. 460 Anſ.

(3)
pia. d. pia. ſols.
1 : 48 :: 2918 10
20 20
20 58370
4×12=48
233480
12
2|0)280176|0
12)140088
20)1167|4
£. 583 14 Anſ.

(4)
d. pia. £. s.
48 : 1 :: 583 14
20
11674
12
pia. ſol.
48)140088(2918 10 anſ.
96
440
432
..88
48
408
384
: 24
20
48)480(10 ſols.
48
..0

(5)

(5)

du. d. duc. ſol. de.
1 : 53 :: 4780 12 6
20 20
20 95612
12 12
240 1147350
53
3442050
5736750
24|0 { 4)6080955|0
6)1520238 3 }
12)253373 0 } 3 = $\frac{1}{8}$
2|0)2111|4 5d.
£. 1055 14 5⅛ Anſ.

(6)

d. duc. £. s. d.
53 : 1 :: 1055 14 5⅛
8 20
424 21114
12
253373
8
424)2026985(4780 duc.
1696
.3309
2968
.3418
3392
..265
20
424)5300(12 ſol.
424
1060
848
212
12
424)2544(6 de.
2544

RUSSIA.

(1)

s. d. rub. £. s. d.

4 2 : 1 :: 614 11 8

12 20

50 12291

12

5|0)14750|0

Ans. 2950 Rubles

(2)

rub. s. d. rub.

1 : 4 2 :: 2950

12 50

50 12)147500

2|0)12291|1 8*d.*

£. 614 11 8 Ans.

(3)

s. d. rub. £. s. d.

4 6 : 1 :: 940 12 6

12 20

54 18812

12

rub. cop.

54)225750(4180 55$\frac{5}{9}$

216

97

54

435

432

30

100

54)3000(55 *cop.*

270

300

270

30

(4)

rub. s. d. rub. cop.

1 : 4 6 :: 4180 55$\frac{5}{9}$

100 12 100

100 54 418055

9 9

900 3762500

9×6=54

33862500

6

9|00)2031750|00

12)225750

2|0)1881|2 6*d.*

£. 940 12 6 Ans.

POLAND

POLAND and PRUSSIA.

(1)

```
£.  s. d.     £.          £.  groſi.    £.
1 : 33 4  ::  780         1 : 270  ::  1300
    12        400                       270
   ----     -----                     -----
400·12)312000                         91000
       ------                        2600
   2|0)2600|0                        ------
       ------                     3|0)35 100|0
   £. 1300 flem.                      ------
                                  Anſ. 11700 florins
```

(2)

```
gros.  £.    flor.          s. d.  £.    £.
270 : 1 :: 11700            33 4 : 1 :: 1300
              30            12             20
           -------          ---          -----
     ⎧ 3)351000|0           400          26000
2|70 ⎨   --------                           12
     ⎩ 9)11700                         ------
         ------                   4|00)3120|00
     £. 1300 flem.                     ------
                                  £. 780 ſterling
```

(3)

```
                                   (3)
                              £.   groſſ.     £.  s. d.
                              1  :  290  ::  1503  3  1½
                             20                20
                             ——              ——————
                             20              30063
                             12                 12
                             ——              ——————
                            240              360757
                              2                   2
                            ———              ———————
                            480              721515
                                                290
                                             ————————
   £.  s.  d.     £.    s.  d.              64936350
   1 : 34  4  ::  875   12  6               1443030
  20   12          20                       ———————        (9|0
  ——   ——       —————               48|0)2092393510(4359115
  20  412       17512                     192          ————gr. p.
  12               12                     ———      r.d.4843 45 5⅝
  ——            ——————                    .172
 240            210150                     144
                   412                     ———
                ——————                    .283
                420300                     240
               210150                      ———
               840600                     .439
               ———————                     432
     ⎧ 4)8658180|0                         ———
 24|0⎨  ———————                            ..73
     ⎩ 6)2164545                             48
        ———————                              ———
   12)360757 3/6=1/2                         255
        ———————                              240
   2|0)300613 1d.                            ———
        ———————                              . 15
   £. 1503 3 1½ flem.                          18
                                             ———
                                       48)270(5 pen.
                                             240
                                             ———
                                              30
```

(4)

(4)

gro. *£.* *r.d.* *gr.* *pen.*

290 : 1 :: 4843 45 5$\frac{5}{8}$

18 90

5220 435915

8 18

41760 7846475

8

41760)62771805(1503*l* 3*s* 1$\frac{1}{2}$*d* *flemiſh*

41760

210118

208800

..131805

125280

..6525

20

41760)130500(3*s.*

125280

..5220

12

41760)62640(1*d.*

41760

20880

4

41760)83520(2*qr.*

83520

(5)

s. d. £. £. s. d.
34 4 : 1 :: 1503 3 1½
12 20
412 30063
4 12
1648 360757
4
£. s. d
1648)1443030(875 12 6 ſter. Anſ.
13184
12463
11536
9270
8240
1030
20
1648)20600(12*s.*
1648
4120
3296
824
12
1648)9888(6 *d.*
9888

SWEDEN.

SWEDEN.

(1)

£. *c.d.* £.
1 : 46 :: 246
46
1476
984
Anſ. 11316 *cop. dollars*

(2)

c.d. £. *c.d.*
46 : 1 :: 11316
1
46)11316(246 *l.ſt.* an.
92
211
184
. 276
276

(3)

£. *c.d.* £. *s.*
1 : 48 :: 293 15
20 20
20 5875
4×12=48.
23500
12
2|0)28200|0
Anſ. 14100 *cop. dol.*

(4)

c.d. £. *c.d.*
48 : 1 :: 14100
1
48)14100(293*l.* 15*s.*
96
450
432
. 180
144
. 36
20
48)720(15*s*
48
240
240

(5)

```
 c.d.   £.    ſ.d. run.
  49  : 1  ::  5838 9
  32               8×12=96ru.=1ſ.d.
  --           -----
  98           46704
 147              12
 ----          ------
 1568         560457
    8              8
 -----       -------   £.  s. d.
 12544       )4483656(357  8 8 23/98
              37632
              -----
              72045
              62720
              -----
               93256
               87808
               -----
                5448
                  20
              -------
      12544)108960(8s.
              100352
              ------
                8608
                  12
              ------
      12544)103296(8d.
              100352
              ------
                2944
```

(6)

£. c.d. £. s. d.
1 : 49 :: 357 8 $8\frac{23}{98}$
20 32 20

20 98 7148
12 147 12

240 1568 85784
98 8 98

1920 12544 686295
2160 772056

23520 8406855
12544

33627420
33627420
42034275
16813710
8406855

(8
23520)105455589120(4483656
94080
113755 96 { 12)560457
94080 8)46704 9
196758 ʃ.d. 5838 *gru.* An.
188160
. . 85989
70560
154291
141120
. 131712
117600
. 141120
141120

IRELAND, AMERICA, and the WEST-INDIES.

(1)

£. £. £.
100 : 106 : : 750
106
4500
7500
1|00)795|00
795*l.* Anſ.

(2)

£. £. £.
106 : 100 : : 795
100
106)79500(750*l.* Anſ.
742
· 530
530
· · · · 0

(3)

£. £. £. *s*
100 : 110 . : 751 10
20 20
2000 15030
110
20|00)16533|00(826*l.* 13*s* a.
160
· · 53
40
133
120
· 13
20
20)260(13*s*.
20
· 60
60

(4)

£. £. £. *s.*
110 : 100 : : 826 13
20 20
2200 16533
100
22|00)16533|00(751*l* 10*s* a.
154
113
110
· · 33
22
11
20
22)220(10*s*
22
· · 0

(5)

(5)

£. £. £.
100 : 150 : : 726
150
36300
726
1|00)1089|00
£. 1089 currency An.

(6)

£. £. £.
150 : 100 : : 1089
100
15|0 { 3)108900|0
5) 3630
£. 726 Anſ.

(7)

£. £. £. s.
160 : 100 : : 1089 10
20 20
3200 21790
100
32|00)21790|00(680*l* 18*s* 9*d*
192
259
256
30
20
32)600(18*s*.
32
280
256
24
12
32)288(9*d*.
288

(8)

£. £. £. *s.* *d.*
100 : 160 : : 680 18 9
20 20
2000 13618
12 12
24000 163425
160
9805500
163425
£. *s.*
24|000)26148|000(1089 10
24
214
192
228
216
12
20
24)240(10*s*.
24
0

ARBI-

ARBITRATION of EXCHANGES.

(1)

£. s. d. d.
1 : 33 4 :: 33
20 12
20 400
12 33
240 1200
1200
2410{4)1320|0
6) 330

Anſ. 55*d.* flem. per cr.

(2)

s. d. £. d.
33 4 : 1 :: 55
12 20
400 20
12
240
11×5=55.
2640
5
4|00)132|00

Anſ. 33*d.* per cr.

(3)

£. £. s. d.
100 : 103 :: 33 4
20 12
2000 400
12 103
24000 1200
4000
240|00)412|00(1*l.* 14*s.* 4*d.*
240
172
20
240)3440(14*s.*
240
1040
960
..80
12
240)960(4*d.*
960

(4)

£. £. £. s. d.
103 : 100 :: 1 14 4
20 20
2060 34
12 12
24720 412
100
24720)41200(1*l* 13*s* 4*d* fl.
24720 [per *l.* ſt
16480
20
24720)329600(13*s*
24720
.82400
74160
.8240
12
24720)98880(4*d*
98880

REDUCTION of VULGAR FRACTIONS.

CASE 1.

(1)

$$\begin{array}{r} 4 \\ 5 \\ \hline 20 \end{array} \quad \begin{array}{r} 6 \\ 5 \\ \hline 30 \end{array}$$ Anſ. $\frac{20}{30}$

(2)

$$5)\underline{20} \quad 4 \qquad 5)\underline{30} \quad 6$$ Anſ. $\frac{4}{6}$

(3)

$$\begin{array}{r} 8 \\ 3 \\ \hline 24 \end{array} \quad \begin{array}{r} 12 \\ 3 \\ \hline 36 \end{array}$$ Anſ. $\frac{24}{36}$

(4

$$3)\underline{24} \quad 8 \qquad 3)\underline{36} \quad 12$$ Anſ. $\frac{8}{12}$

CASE 2.

(5)

$\frac{4}{1}$ Anſ.

(6)

$\frac{6}{1}$ Anſ.

(7)

$\frac{8}{1}$ Anſ.

(8)

$\frac{12}{1}$ Anſ.

CASE 3.

(9

$$\begin{array}{r} 8 \\ 4 \\ \hline 32 \end{array}$$ then $\frac{32}{4}$ is the Anſ.

$4)\underline{32} \; 8 = \frac{8}{1} = 8$ proof.

(10)

$$\begin{array}{r} 6 \\ 5 \\ \hline 30 \end{array}$$ then $\frac{30}{5}$ is the fraction required.

$5)30 = \frac{6}{1} = 6$ proof

—

1

(11)

(11)

$$\begin{array}{l} 9 \\ 6 \\ \hline 54 \end{array}$$

Anſ. $\frac{54}{6}$ the required fra.

for $\frac{54}{6}=\frac{9}{1}=9$ proof

(12)

$$\begin{array}{l} 12 \\ 10 \\ \hline 120 \end{array}$$

Anſ. $\frac{120}{10}$ the frac. requ.

for $\frac{120}{10}=\frac{12}{1}=12$ proof

CASE 4.

(13)

$$\begin{array}{ll} 1 & 2 \\ 2 & 3 \\ \hline 2 & 6 \\ 3 & 4 \\ \hline 6\ N. & 24\ D. \end{array}$$

Anſ. $\frac{6}{24}$ the ſingle fraction

(14)

$$\begin{array}{ll} 2 & 3 \\ 3 & 4 \\ \hline 6 & 12 \\ 5 & 6 \\ \hline 30\ N. & 72\ D. \end{array}$$

Anſ. $\frac{30}{72}$ the ſingle fraction

(15)

$$\begin{array}{ll} 3 & 4 \\ 4 & 5 \\ \hline 12 & 20 \\ 5 & 7 \\ \hline 60\ N. & 140\ D. \end{array}$$

Anſ. $\frac{60}{140}$ the ſingle fraction

(16)

$$\begin{array}{ll} 4 & 5 \\ 5 & 6 \\ \hline 20 & 30 \\ 8 & 9 \\ \hline 160\ N. & 270\ D. \end{array}$$

Anſ. $\frac{160}{270}$ the frac. required

CASE 5.

(17)

$$\begin{array}{l} 5\frac{1}{2} \\ 2 \\ \hline 11 \end{array}$$

Anſ. $\frac{11}{2}$ the required fr.

(18)

$$\begin{array}{l} 6\frac{2}{3} \\ 3 \\ \hline 20 \end{array}$$

Anſ. $\frac{20}{3}$ the required fra.

(19)

(19)

$12\frac{4}{6}$
6
—
76 Anſ. $\frac{76}{6}$ the req. frac.

(20)

$25\frac{3}{8}$
8
—
203 Anſ. $\frac{203}{8}$ the requ. frac.

CASE 6.

(21)

2)11
—
$5\frac{1}{2}$ Anſ.

(22)

3)20
—
$6\frac{2}{3}$ Anſwer

(23)

6)76
—
$12\frac{4}{6}$ Anſ.

(24)

8)203
—
$25\frac{3}{8}$ Anſwer

CASE 7.

(25)

72)120(1
72
—
48)72(1
48
—
24)48(2
48
—
Anſ. 24 the greateſt common
[meaſure

(26)

126)182(1
126
—
56)126(2
112
—
4)56(14
4
—
16
16
—
Anſ. 4 the greateſt common
[meaſure

(27)

(27)

```
2146)3642(1
     2146
     ----
     1496)2146(1
          1496
          ----
         . 650)1496(2
               1300
               ----
              . 196)650(3
                    588
                    ---
                   . 62)196(3
                        186
                        ---
                       . 10)62(6
                            60
                            --
                           . 2)10(5
                               10
                               --
```

(28)

```
365)4896(13
    365
    ----
    1246
    1095
    ----
   . 151)365(2
         302
         ---
        . 63)151(2
             126
             ---
            . 25)63(2
                 50
                 --
                 13)25(1
                    13
                    --
                    12)13(1
                       12
                    * 1)12(12
                        12
                        --
```

Anſ. 2 is the common meaſure required

* When 1 is the greateſt common meaſure, as in Example 28, the fraction is already in its loweſt terms; the numbers being prime to each other.

(29)

1073)1821(1
1073
748)1073(1
748
325)748(2
650
98)325(3
294
31)98(3
93
5)31(6
30
1)5(5
5

then 1)$\frac{1073}{1821}$(=$\frac{1073}{1821}$ Anſ.

(30)

1416)6424(4
5664
760)1416(1
760
656)760(1
656
104)656(6
624
32)104(3
96
8)32(4
32

then 8)$\frac{1416}{6424}$(=$\frac{177}{803}$ Anſ.

(31)

3642)4516(1
3642
874)3642(4 then $2)\frac{3642}{4516}(=\frac{1821}{2258}$ Anſ.
3496
146)874(5
730
144)146(1
144
2)144(72
14
4
4

(32)

340)2136(6
2040
96)340(3 then $4)\frac{340}{2136}(\frac{85}{534}$ Anſ.
288
52)96(1
52
44)52(1
44
8)44(5
40
4)8(2
8

33.

(33)

816)4446(5
4080
366)816(2 then 6)$\frac{816}{4446}$($\frac{136}{741}$ Anſ.
732
84)366(4
336
30)84(2
60
24)30(1
24
6)24(4
24

(34)

2688)3072(1
2688 then
384)2688(7 384)2688(7 384)3072(8
2688 2688 3072

Anſ. $\frac{7}{8}$ the fraction required.

C A S E. 9.

(35)

2 3 3
4 3 4
8N. 9N. 12D. Anſ. $\frac{8}{12}$ and $\frac{9}{12}$ the frac. required.

(36

3 4 5 4
5 4 5 5
15 16 25 20 Anſ. $\frac{90}{120}$, $\frac{96}{120}$, $\frac{100}{120}$. the [required fractions.
6 6 4 6
90N. 96N. 100N. 120D.

(37)

1	2	3	6	2
3	2	3	4	3
3	4	9	24	6
4	4	2	3	4
12	16	18	72	24
7	7	7	2	7
84N.	112N.	126N.	144N.	168D.

Anſ. $\frac{84}{168}$, $\frac{112}{168}$, $\frac{126}{168}$, $\frac{144}{168}$ the fractions required.

(38)

1	1	1	1	3
4	3	4	5	4
4	3	4	5	12
5	5	3	4	5
20	15	12	20	60
6	6	6	3	6
120N.	90N.	72N.	60N.	360D.

Anſ. $\frac{120}{360}$, $\frac{90}{360}$, $\frac{72}{360}$, $\frac{60}{360}$, the fractions required.

(39)

5	4	5	6	8
9	8	9	10	9
45	32	45	60	72
10	10	8	9	10
450	320	360	540	720
12	12	12	8	12
5400N.	3840N.	4320N.	4320N.	8640Deno.

Anſ. $\frac{5400}{8640}$, $\frac{3840}{8640}$, $\frac{4320}{8640}$, $\frac{4320}{8640}$ the fractions required.

(40)

(40)

1	1	1	1	1	3
4	3	4	5	6	4
4	3	4	5	6	12
5	5	3	4	5	5
20	15	12	20	30	60
6	6	6	3	4	6
120	90	72	60	120	360
7	7	7	7	3	7
840N.	630N.	504N.	420N.	360N.	2520Deno.

Anſ. $\frac{840}{2520}$, $\frac{630}{2520}$, $\frac{504}{2520}$, $\frac{420}{2520}$, $\frac{360}{2520}$ the required fracs.

If one fraction be equivalent to another, it will hold as the numerator of the one is to its denominator, ſo is the numerator of the other to its denominator, or as one numerator is to the other, ſo is one denominator to the other, for in the above example it appears that $\frac{1}{3}$ is = to $\frac{840}{2520}$. to prove which ſay; As 840 : 2520 :: 1 : 3 proof; and after this manner may any of theſe operations be proved.

CASE 10.

(41)

s.	d.	s.
3	6	20
12		12
42		240

Anſ. $\frac{42}{240}$ the fraction requ.

(42)

d.	d.
$6\frac{1}{2}$	12
2	2
13	24

Anſ. $\frac{13}{24}$ frae. re

(43)

r.	p.	r.
3	12	4
40		40
132		160

Anſ. $\frac{132}{160}$

(44)

qr.	lb.	lb.
2	12	112 = 1 cwt.

4×7=28
8
7
68 Anſ. $\frac{68}{112}$.

(45)

in.	*in.*
$8\frac{1}{2}$	12
2	2
17	24

Anſ. $\frac{17}{24}$

(46)

cwt.	*cwt.*
$12\frac{1}{2}$	20
2	2
25	40

Anſ. $\frac{25}{40}$

(47)

oz. dw. gr.	*lb.*
6 12 16	1
20	12
132	12
4×6=24	20
528	240
6	4×6=24
3184	960
	6
	5760

Anſ. $\frac{3184}{5760}$

(48)

qr. lb. oz. drs.	*cwt.*
3 2 2 6	1
4×7=28,	4
12	4
7	4×7=28
86	16
16	7
1378	112
16	16
22054	1792
	16
	28672

Anſ. $\frac{22054}{28672}$.

CASE II.

(49)

4
12
48
20
960

Anſ. $\frac{3}{960}$

(50)

3
20
60
12
720

Anſ. $\frac{720}{960}=\frac{3}{4}$ in its loweſt terms

(51)

$$\begin{array}{r} 6 \\ 20 \\ \hline 120 \end{array}$$

Anſ. $\frac{3}{120}$.

(52)

$$\begin{array}{r} 3 \\ 20 \\ \hline 60 \end{array}$$

Anſ. $\frac{60}{120}=\frac{1}{2}$ in its loweſt terms.

(53)

$$\begin{array}{r} 3 \\ 12 \\ \hline 36 \\ 20 \\ \hline 720 \end{array}$$

Anſ. $\frac{720}{3}$.

(54)

$$\begin{array}{r} 5 \\ 20 \\ \hline 100 \\ 12 \\ \hline 1200 \end{array}$$

Anſ. $\frac{720}{1200}=\frac{3}{5}$.

(55)

$$\begin{array}{r} lb \\ 112 \\ 5 \\ \hline 560 \\ 16 \\ \hline 8960 \\ 16 \\ \hline 143360 \end{array}$$

Anſ. $\frac{3}{143360}$ the required fra.

(56)

$$\begin{array}{r} 3 \\ 112 \\ \hline 336 \\ 16 \\ \hline 5376 \\ 16 \\ \hline 86016 \end{array}$$

Anſ. $\frac{86016}{143360}=\frac{3}{5}$ in its loweſt t.

(57)

$$\begin{array}{r} 5 \\ 4 \\ \hline 20 \\ 4 \\ \hline 80 \end{array}$$

Anſ. $\frac{4}{80}$.

(58)

$$\begin{array}{r} 4 \\ 4 \\ \hline 16 \\ 4 \\ \hline 64 \end{array}$$

Anſ. $\frac{64}{80}=\frac{4}{5}$ in its loweſt terms.

(59)
9
24
216
60
12960
Anſ. $\frac{8}{12960}$.

(60)
8
24
192
60
11520
Anſ. $\frac{11520}{12960}=\frac{8}{9}$ in its loweſt te.

CASE 12.

(61)
322
20
960)6440(6s 8½d Anſ.
5760
680
12
960)8160(8d.
7680
480
4
960)1920(2qrs.
1920

(62)
42
20
240)840(3s. 6d. Anſ.
720
120
12
240)1440(6d.
1440

(63)
13
12
24)156(6½d. Anſ.
144
12
4
24)48(2qrs.
48

(64)
132
4
160)528(3r. 12p. Anſ.
480
48
40
160)1920(12 poles
160
320
320

(65)

(65)
68
4
112)272(2*q.* 12*lb.* Anſ.
224
48
4×7=28.
192
7
112)1344(12*lb.*
112
224
224

(67)
25
20
4|0)50|0(12½*cwt.* Anſ.
4
10
8
2
4
4)8(2*q.*
8

(66)
17
12
24)204(8½ *inches* Anſ.
192
12
4
24)48(2*q.*
48

(68)
3184
12
5760)38208(6*oz.* 12*d.* 16*g*
34560
3648
20
5760)72960(12*dw.*
5760
15360
11520
3840
4×6=24
15360
6
5760)92160(16*grs.*
5760
34560
34560

(69)

(69)
22054
4
qr. lb. oz. dr.
28672)88216(3 2 2 6 Anſ.
86016
2200
4×7=28.
8800
7
28672)61600(2lb.
57344
4256
16
28672)68096(2oz.
57344
10752
16
28672)172032(6dr.
172032

(70)
483
9×3=27.
4347
3
1394)13041(9s. 4¼d. $\frac{62}{1394}$ An
12546
..495
12
1394)5940(4d.
5576
.364
4
1394)1456(1qr.
1394
..62

ADDITION of VULGAR FRACTIONS.

(1)
2
3
5 Anſ. $\frac{5}{4}$.

(2)
3
5
8 Anſ. $\frac{8}{8}$=1

(3)

(3)

firſt $\frac{2}{3}$, $\frac{4}{6}$ reduced to a common denominator,$=\frac{12}{18}$, and $\frac{12}{18}$

then 12
12
—
24
Anſ. $\frac{24}{18}$.

(5)

firſt $\frac{1}{3}$ of $\frac{1}{4}=\frac{1}{12}$ then $\frac{1}{12}$ and $\frac{3}{8}=\frac{8}{96}$ and $\frac{36}{96}$,

36
8
—
44 Anſ. $\frac{44}{96}$.

(7)

firſt $\frac{5}{10}$ of a ſhilling$=\frac{5}{200}$£. and $\frac{5}{8}$ of a penny$=\frac{5}{1920}$ of a pound, then $\frac{3}{5}$, $\frac{5}{200}$, and $\frac{5}{1920}=\frac{1152}{1920}$, $\frac{48}{1920}$, $\frac{5}{1920}$ when reduced to a common denominator, and added together$=\frac{1205}{1920}=12s.\ 6\frac{1}{2}d.$ $\frac{960}{1920}$ Anſwer.

(9)

firſt $6\frac{1}{2}$, $7\frac{3}{4}$, $8\frac{1}{5}$ when reduced to a common denominator $=\frac{260}{40}$, $\frac{310}{40}$, $\frac{328}{40}$, which added together$=\frac{898}{40}=22\frac{18}{40}$, the Anſwer.

(4)

firſt $\frac{3}{5}$, $\frac{6}{9}=\frac{27}{45}$, $\frac{30}{45}$

then 27
30
—
57 Anſ. $\frac{57}{45}$.

(6)

firſt $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{1}{4}$ when reduced to a common denominator $=\frac{48}{208}$, $\frac{64}{208}$, $\frac{72}{208}$, $\frac{24}{208}$ added together$=\frac{208}{96}=2s.\ 2d.$ Anſwer.

(8)

firſt $\frac{1}{4}$, of 1*s.*$=\frac{1}{80}$ of 1£. then $\frac{201}{460}+\frac{1}{80}=\frac{460}{36800}+\frac{16080}{36800}=\frac{16540}{36800}$£.$=8s.\ 11\frac{3}{4}d.\frac{176}{368}$ Anſ.

(10)

firſt $\frac{5}{9}$ of a week$=\frac{840}{9}$ of an hour, then $\frac{840}{9}+\frac{3}{4}$ reduced to a common denominator, $=\frac{3360}{36}$, $\frac{27}{36}$ and added together$=\frac{3387}{36}$ of an hour, $=94\frac{3}{36}$ hours Anſ.

SUBTRACTION

SUBTRACTION of VULGAR FRACTIONS.

(1)
from $\frac{4}{6}$
take $\frac{2}{6}$

$\frac{2}{6}$ Anſ.

(2)
from $\frac{3}{8}$
take $\frac{2}{8}$

$\frac{1}{8}$ Anſ.

(3)
from $\frac{18}{25}$
take $\frac{12}{25}$

$\frac{6}{25}$ Anſ.

(4)
from $\frac{14}{18}$
take $\frac{9}{18}$

$\frac{5}{18}$ Anſ.

(5)
from $12\frac{4}{6}$
take $6\frac{2}{6}$

$6\frac{2}{6}$ Anſ.

(6)
from $14\frac{14}{18}$
take $8\frac{4}{18}$

$6\frac{10}{18}$ Anſ.

(7)
from $862\frac{12}{28}$
take $224\frac{16}{28}$

diff. $637\frac{24}{28}$ Anſ.

(8)
from $961\frac{3}{9}$
take $460\frac{4}{9}$

diff. $500\frac{8}{9}$ Anſ.

(9)
firſt $\frac{2}{9}$, $\frac{3}{8} = \frac{16}{72}$, $\frac{27}{72}$, then $\frac{27}{72} - \frac{16}{72} = \frac{11}{72}$ the difference.

(10)
firſt $\frac{2}{3}$ of $\frac{8}{9} = \frac{16}{27}$, and $\frac{16}{27}$, $\frac{4}{12} = \frac{192}{324}$, $\frac{108}{324}$, then $\frac{192}{324} - \frac{108}{324} = \frac{84}{324}$ the difference.

(11)
from 1
take $0\frac{16}{24}$

difference $\frac{8}{24}$ Anſ.

(12)
from 64
take $\frac{16}{24}$

diff. $63\frac{8}{24}$ Anſ.

Fractions being ſuch, or reduced to ſuch a ſtate, that all the numerators repreſent things of the ſame denomination, both abſolute and relative, their ſum or difference muſt therefore be a number of ſuch parts as the common denominator expreſſes; whence, the reaſon of addition and ſubtraction is manifeſt.

MULTIPLI-

MULTIPLICATION of VULGAR FRACTIONS.

(1)

$$\frac{2\times5}{3\times8}=\frac{10}{24}$$ Anſ.

(2)

$$\frac{4\times6}{5\times10}=\frac{24}{50}$$ Anſ.

(3)

$$\frac{4\times5}{16\times26}=\frac{20}{316}$$ Anſ.

(4)

$$\frac{3\times6}{4\times9}=\frac{18}{36}$$ Anſ.

(5)

$7\frac{1}{4}=\frac{29}{4}$ then $\frac{29\times3}{4\times4}=$

$\frac{87}{16}=5\frac{7}{16}$ Anſ.

(6)

$3\frac{4}{7}=\frac{25}{7}$ and $12=\frac{12}{1}$ then

$$\frac{25\times12}{7\times1}=\frac{300}{7}$$ Anſ.

(7)

$\frac{3}{4}$ of $\frac{5}{6}=\frac{15}{24}$ and $1=\frac{1}{1}$.

then $\frac{15\times1}{24\times1}=\frac{15}{24}$ Anſ.

(8)

$\frac{7}{8}$ of $\frac{3}{4}=\frac{21}{32}$ and $\frac{2}{5}$ of $\frac{6}{8}=\frac{12}{40}$,

then $\frac{21\times12}{40\times32}=\frac{252}{1280}$ An.

(9)

£.	s.	d.
12	6	$8\frac{3}{9}$
		3.
£. 37	0	1 Anſ.

(10)

£.	s.	d.
6	12	$4\frac{5}{6}$
		4
£. 26	9	$7\frac{2}{6}$ Anſ.

DIVISION of VULGAR FRACTIONS.

(1)

$\frac{5}{8})\frac{2}{3}(\frac{16}{15}$ Anſ.

Or thus by inverting the diviſor. $\frac{8}{5})\frac{2}{3}(\frac{16}{15}$ Anſ. as before.

(2)

$\frac{6}{10})\frac{4}{5}(\frac{40}{30}$ Anſ.

Or thus by inverting the diviſor, $\frac{10}{6})\frac{4}{5}(\frac{40}{30}$ Anſ. as before.

(3)

$\frac{5}{26})\frac{4}{16}(\frac{104}{80}$ Anſ.

(4)

$\frac{6}{9})\frac{3}{4}(\frac{27}{24}$ Anſ.

(5)

firſt $7\frac{1}{4}=\frac{29}{4}$ then
$\frac{3}{4})\frac{29}{4}(\frac{116}{12}$ Anſ.

(6)

firſt $3\frac{4}{7}=\frac{25}{7}$ and $12=\frac{12}{1}$
$\frac{12}{1})\frac{25}{7}(\frac{25}{84}$ Anſ.

(7)

firſt $\frac{3}{4}$ of $\frac{5}{6}=\frac{15}{24}$ and $1=\frac{1}{1}$
$\frac{1}{1})\frac{15}{24}(\frac{15}{24}$ Anſ.

(8)

firſt $\frac{7}{8}$ of $\frac{3}{4}=\frac{21}{32}$ and $\frac{2}{5}$ of $\frac{6}{8}=\frac{12}{40}$
$\frac{12}{40})\frac{21}{32}(\frac{840}{384}$ Anſ.

(9)

$$\begin{array}{llll} & £. & s. & d. \\ 3) & 37 & 0 & 1 \\ \hline £. & 12 & 6 & 8\frac{1}{3} \text{ Anſ.} \end{array}$$

(10)

$$\begin{array}{llll} & £. & s. & d. \\ 4) & 26 & 9 & 7\frac{2}{6} \\ \hline £. & 6 & 12 & 4\frac{5}{6} \text{ Anſ.} \end{array}$$

THE RULE OF THREE DIRECT, IN VULGAR FRACTIONS.

(1)

$$\begin{array}{ccccc} \text{yd.} & & £. & & \text{yd.} \\ \frac{1}{4} & : & \frac{2}{5} & :: & \frac{5}{2}=2\frac{1}{2} \end{array}$$

$$\begin{array}{ll} 4 & 1 \\ \underline{2} & \underline{5} \\ 8 & 5 \\ \underline{5} & \underline{2} \\ 40\text{N.} & 10\text{D.} \end{array}$$

$\frac{40}{10}=\frac{4}{1}=4£.$ the Anſ.

(2)

$$\begin{array}{ccccc} £. & & \text{yd} & & £. \\ \frac{4}{1} & : & \frac{5}{2} & :: & \frac{2}{5} \end{array}$$

$$\begin{array}{ll} 1 & 4 \\ \underline{5} & \underline{2} \\ 5 & 8 \\ \underline{2} & \underline{5} \\ 10\text{N.} & 40\text{D.} \end{array}$$

$\frac{10}{40}=\frac{1}{4}$ *yd.* Anſ.

(3)

firſt $4\frac{3}{4}=\frac{19}{4}$; 4*l.* 10*s.*$=\frac{9}{2}$; $11\frac{1}{2}$ $=\frac{23}{2}$

yds. £. *yds.*

$\frac{19}{4} : \frac{9}{2} :: \frac{23}{2}$

$$\begin{array}{rr} 4 & 19\\ 9 & 2\\ \hline 36 & 38\\ 23 & 2\\ \hline 108 & 76\text{D.}\\ 72 & \\ \cline{1-1} 828\text{N.} & \end{array}$$

$\frac{828}{76}=\frac{207}{19}=10\frac{17}{19}$£. Anſ.

(5)

firſt 1*l.* 15*s.*$=\frac{35}{20}$ 10 days$=\frac{10}{1}$ and 52*l.* 10*s.*$=\frac{1050}{20}$.

£. *days* £.

$\frac{35}{20} : \frac{10}{1} :: \frac{1050}{20}$

$$\begin{array}{rr} 20 & 35\\ 10 & 1\\ \hline 200 & 35\\ 1050 & 20\\ \hline 210000\text{N.} & 700\text{D.} \end{array}$$

$\frac{210000}{700}=\frac{300}{1}=300$ days Anſ.

(4)

firſt 100*l.*$=\frac{100}{1}$ $4\frac{1}{2}=\frac{9}{2}$ 240 $=\frac{240}{1}$

£. £. £.

$\frac{100}{1} : \frac{9}{2} :: \frac{240}{1}$

$$\begin{array}{rr} 240 & 100\\ 9 & 2\\ \hline 2160 & 200\\ 1 & 1\\ \hline 2160\text{N.} & 200\text{D.} \end{array}$$

$\frac{2160}{200}=\frac{54}{5}=10\frac{4}{5}=10$*l.* 16*s.* an

(6)

firſt $300=\frac{300}{1}$ 52*l.* 10*s.*$=\frac{1050}{20}$ and $10=\frac{10}{1}$; then

days. £. *days.*

$\frac{300}{1} : \frac{1050}{20} :: \frac{10}{1}$

$$\begin{array}{rr} 1050 & 300\\ 1 & 20\\ \hline 1050 & 6000\\ 10 & 1\\ \hline 10500\text{N.} & 6000\text{D.} \end{array}$$

$\frac{10500}{6000}=\frac{7}{4}=1\frac{3}{4}=1$*l.* 15*s.* Anſ.

(7)

firſt $72=\frac{72}{1}$ $39^{l.}\ 12s.=\frac{792}{20}$ $110^{l.}=\frac{110}{1}$ then,

$$\begin{array}{ccccc} \text{£.} & & \textit{gal.} & & \text{£.} \\ \frac{792}{20} & : & \frac{72}{1} & :: & \frac{110}{1} \end{array}$$

$$\begin{array}{rcr} 20 & & 792 \\ 72 & & 1 \\ \hline 1440 & & 792 \\ 110 & & 1 \\ \hline 158400\text{N.} & & 792\text{D.} \end{array}$$

$\frac{158400}{792}=\frac{200}{1}=200$ *gals.* Anſ.

(8)

firſt $200=\frac{200}{1}$ $110=\frac{110}{1}$ $72=\frac{72}{1}$.

$$\begin{array}{ccccc} \textit{gal.} & & \text{£.} & & \textit{gal.} \\ \frac{200}{1} & : & \frac{0}{1} & :: & \frac{72}{1} \end{array}$$

$$\begin{array}{rcr} 72 & & 200 \\ 110 & & 1 \\ \hline 7920 & & 200 \\ 1 & & 1 \\ \hline 7920\text{N.} & & 200\text{D.} \end{array}$$

Anſ. $\frac{7920}{200}=\frac{198}{5}=39\frac{3}{5}=39^{l}$ 12*s.*

(9)

$$\begin{array}{ccccc} \text{£.} & & \textit{ſhip.} & & \text{£.} \\ \frac{249}{1} & : & \frac{1}{6} & :: & \frac{747}{1} \end{array}$$

$$\begin{array}{rcr} 747 & & 249 \\ 1 & & 6 \\ \hline 737 & & 1494 \\ 1 & & 1 \\ \hline 747\text{N.} & & 1494\text{D.} \end{array}$$

$\frac{747}{1494}=\frac{1}{2}$ of her Anſ.

(10)

firſt $40\frac{1}{2}=\frac{81}{2}$ $1\frac{3}{4}=\frac{7}{4}$ and $24\frac{1}{2}\times 50=\frac{2450}{2}$; then

$$\begin{array}{ccccc} f & & \text{£.} & & f. \\ \frac{81}{2} & : & \frac{7}{4} & :: & \frac{2450}{2} \end{array}$$

$$\begin{array}{rcr} 2450 & & 81 \\ 7 & & 4 \\ \hline 17150 & & 324 \\ 2 & & 2 \\ \hline 34300\text{N.} & & 648\text{D.} \end{array}$$

$\frac{34300}{648}=\frac{8575}{162}=52\frac{151}{162}=52$*l.* 18*s.* $7\frac{1}{2}$*d.* Anſ.

(11)

$3\frac{1}{2}=\frac{7}{2}$; $5\frac{1}{4}=\frac{21}{4}$; $2\frac{1}{4}\times 5=\frac{45}{4}$

c. £. c.

$\frac{7}{2} : \frac{21}{4} :: \frac{45}{4}$

$$\begin{array}{rr} 45 & 7 \\ 21 & 4 \\ \hline 45 & 28 \\ 90 & 4 \\ \hline 945 & 112\text{D.} \\ 2 & \\ \hline 1890\text{N.} & \end{array}$$

$\frac{1890}{112}=\frac{945}{56}=16\frac{49}{56}=16l.$ 17*s.* 6*d.* Anſ.

(12)

16*l.* 17*s.* 6*d.*$=\frac{945}{56}$; $11\frac{1}{4}=\frac{45}{4}$; 5*l.* 5*s.*$=\frac{21}{4}$.

£. c. £.

$\frac{945}{56} : \frac{45}{4} :: \frac{21}{4}$

$$\begin{array}{rr} 56 & 945 \\ 45 & 4 \\ \hline 280 & 3780 \\ 224 & 4 \\ \hline 2520 & 15120\text{D.} \\ 21 & \\ \hline 2520 & \\ 5040 & \\ \hline 52920\text{ N.} & \end{array}$$

$2520\ \frac{52920}{15120}=\frac{7}{2}=3\frac{1}{2}$ *cwt.* [Anſ.

THE RULE OF THREE INVERSE IN VULGAR FRACTIONS.

(1)

firſt $2\frac{1}{2}=\frac{5}{2}$. $2=\frac{2}{1}$. then As $\frac{2}{1} : \frac{5}{2} :: \frac{3}{4}$

$$\begin{array}{rr} 4 & 3 \\ 5 & 2 \\ \hline 20 & 6 \\ 2 & 1 \\ \hline 40\text{N.} & 6\text{D.} \end{array}$$

∴ $\frac{40}{6}=\frac{20}{3}=6\frac{2}{3}$ yds. Anſ.

(2)

firſt $6\frac{2}{3}=\frac{20}{3}$, $2\frac{1}{2}=\frac{5}{2}$ then As $\frac{20}{3} : \frac{3}{4} :: \frac{5}{2}$

$$\begin{array}{rr} 20 & 5 \\ 3 & 4 \\ \hline 60 & 20 \\ 2 & 3 \\ \hline 120\text{N.} & 60\text{D.} \end{array}$$

∴ $\frac{120}{60}=\frac{2}{1}=2$ yards Anſ.

(3)

firſt 22 = $\frac{22}{1}$. 220 = $\frac{220}{1}$. $16\frac{1}{2} = \frac{33}{2}$ then,

As $\frac{22}{1} : \frac{220}{1} :: \frac{33}{2}$

$$\begin{array}{rr} 220 & 33 \\ 22 & 1 \\ \hline 440 & 33 \\ 440 & 1 \\ \hline 4840 & 33\text{D.} \\ 2 & \\ \hline 9680\text{N.} & \end{array}$$

$\therefore \frac{9680}{33} = \frac{880}{3} = 293\frac{1}{3}$ long an.

(4)

firſt $50\frac{2}{3} = \frac{152}{3}$£. $6\frac{3}{4} = \frac{27}{4}$ mo. $21\frac{1}{2} = \frac{43}{2}l.$ then.

As $\frac{152}{3} : \frac{27}{4} :: \frac{43}{2}$

$$\begin{array}{rr} 152 & 43 \\ 27 & 4 \\ \hline 1064 & 172 \\ 304 & 3 \\ \hline 4104 & 516\text{D.} \\ 2 & \\ \hline 8208\text{N.} & \end{array}$$

$\therefore \frac{8208}{516} = 15$m. 3w. $4\frac{17}{43}$ days [Anſ.

RULE OF FIVE, IN VULGAR FRACTIONS.

(1)

✤ $\frac{100}{1} : \frac{5}{1} :: \frac{700}{1}$

✤ $\frac{12}{1} : \frac{5}{1} :: \frac{9}{1}$

$$\frac{\frac{700}{1}\times\frac{9}{1}\times\frac{5}{1}}{\frac{100}{1}\times\frac{12}{1}} = \frac{31500}{1200} = 26l.\ 5s.$$

[Anſ.

(2)

firſt 26*l.* 5*s.* = $26\frac{1}{4}l. = \frac{105}{4}$

✤ $\frac{700}{1} : \frac{105}{4} :: \frac{100}{1}$

✤ $\frac{9}{1} : \frac{105}{4} :: \frac{12}{1}$

$$\frac{\frac{105}{4}\times\frac{100}{1}\times\frac{12}{1}}{\frac{700}{1}\times\frac{9}{1}} = \frac{\frac{126000}{4}}{\frac{6300}{1}}$$

$= \frac{126000}{25200} = 5l,$ Anſ.

(3)

firſt $25\frac{1}{2} = \frac{51}{2}$

✤ $\frac{13}{1} : \frac{51}{2} :: \frac{28}{1}$

✤ $\frac{4}{1} :$ — $:: \frac{36}{1}$

$\frac{28}{1}\times\frac{36}{1}\times\frac{51}{2} = \frac{51408}{2}$ divide.

$\frac{13}{1}\times\frac{4}{1} = \frac{52}{1}$ diviſor

$\frac{52}{1})\frac{51408}{2}(\frac{51408}{104} = 494\frac{4}{13}$ *rods* [Anſ.

(4)

w. £. w.

✤ $\frac{42}{1} : \frac{240}{1} :: \frac{92}{1}$

✤ $\frac{12}{1} : \frac{240}{1} :: \frac{28}{1}$

$\frac{240}{1}\times\frac{92}{1}\times\frac{28}{1} = \frac{618240}{1}$ divid.

$\frac{42}{1}\times\frac{12}{1} = \frac{504}{1}$ diviſor

$\frac{504}{1})\frac{618240}{1}(1226\frac{2}{3} = 1226l.$ [13*s.* 4*d.* Anſ.

(5)

(5)

firſt $1\frac{1}{2}$days$=\frac{3}{2}$, then

s. *t.* *s.*

✠ $\frac{6}{1} : \frac{3}{1} :: \frac{420}{1}$

$\frac{3}{2}$*d.* : — :: $\frac{9}{1}$ ✠ days

$\frac{420}{1}\times\frac{3}{2}\times\frac{3}{1}=\frac{3780}{2}$ dividend

and $\frac{6}{1}\times\frac{9}{1}=\frac{54}{1}$ diviſor

$\frac{54}{1})\frac{3780}{2}(\frac{3780}{108}=35$ Taylors Anſ.

(6)

firſt $6\frac{1}{2}$*d.*$=\frac{13}{2}$.

c. *d.* *c.*

✠ $\frac{1}{1} : \frac{13}{2} :: \frac{5}{1}$

✠ $\frac{20}{1}$: — :: $\frac{100}{1}$

$\frac{100}{1}\times\frac{13}{2}\times\frac{5}{1}=\frac{6500}{2}$ dividend

and $\frac{20}{1}\times\frac{1}{1}=\frac{20}{1}$ diviſor

$\frac{20}{1})\frac{6500}{40}=13$*s.* $6\frac{1}{2}$*d.* Anſ.

DECIMAL FRACTIONS.

ADDITION of DECIMALS.

(1) 447·93

(2) 46·737

(3) 4594·5

(4) 7·479

(5) 49·131

(6) 474·30

SUBTRACTION of DECIMALS.

(1) 442·7

(2) 55·301

(3) 7·6216

(4) 7·833

(5) ·65179

(6) 4485·4

MULTIPLI-

MULTIPLICATION of DECIMALS.

(1)
·3046825
234
12187300
9140475
6093650
71·2957050

(2)
·3046825
23·4
12187300
9140475
6093650
7·12957050

(3)
·431162163
2·48
3449297304
1724648652
862324326
1·06928216424

(4)
·324637254
·567
2272460778
1947823524
1623186270
·184069323018

(5)
478·216243
12.3456789
4303946187
3825729944
3347513701
2869297458
2391081215
1912864972
1434648729
956432486
478216243
5903·9041808423727

(6)
1234·56789
478·216243
370370367
493827156
246913578
740740734
123456789
246913578
987654312
864197523
493827156
590390·41808423727

CONTRAC-

CONTRACTIONS.

(1)
·3046825 multiplicand
432 multiplier inverted
6093
914
121
71·28 product

(2)
3046825 multiplicand
4·32 multiplier inverted
609
91
12
7·12 product

(3)
·431162163
84·2
86
17
3
1·06 product

(4)
·324637254
765·0
162
19
2
·183 product

(5)
478·216243
9876543·21
4782162
956432
143464
19128
2391
286
33
3
5903·899 product

(6)
1234·56789
342612 874
493827
86419
9876
246
12
7
590387· product

DIVISION.

DIVISION of DECIMALS.

(1)

```
57926)31415926·000(542·345
      289630
      ------
       245292
       231704
       ------
        135886
        115852
        ------
         200340
         173778
         ------
          265620
          231704
          ------
           339160
           289630
           ------
            49530
```

(2)

```
579·26)31415926·000(54234·5
       289630
       ------
        245292
        231704
        ------
         135886
         115852
         ------
          200340
          173778
          ------
           265620
           231704
           ------
            339160
            289630
            ------
             49530
```

(3)

```
57926)3·1415926(·0000542
        289630
        ------
        245292
        231704
        ------
         135886
         115852
         ------
          20034
```

(4)

```
57·926)31·415926(·542
          289630
          ------
          245292
          231704
          ------
           135886
           115852
           ------
            20034
```

(5)

```
·57926)31415926·00000(54234585
       289630
       ------
       245292
       231704
       ------
        135886
        115852
        ------
         200340
         173778
         ------
          265620
          231704
          ------
           339160
           289630
           ------
            495300
            463408
            ------
             318920
             289630
             ------
              29290
```

(6)
·579263·1415926(5·42
289630
245292
231704
135886
115852
20034

(7)
57926)·31415926)·00000524
289630
245292
231704
135886
115852
20034

(8)
5·7926)·31415926(·0542
289630
245392
231704
135886
115852
20034

(9)
·57926)·31415926(·542
289630
245292
231704
135886
115852
20034

CONTRACTIONS.

(1)
412·35678)12884·9709830 29794(31·24
12370
514
412
102
82
20
16
4

(2)

(2)

```
232·14678)5445·418058704098(23·45
...  .          4642
                ----
                 803
                 696
                ----
                 107
                  92
                ----
                  15
                  11
                  --
                   4
```

(3)

```
12345·6789)5903·9041808423727(·47821
.. :..         49382
               -----
                9657
                8641
               -----
                1016
                 987
               -----
                  29
                  24
                  --
                   5
                   1
                  --
                   4
```

(4)

4782162·43)590390418·08423727(123·456789

• • • • • • • • • •

478216243

112174175

95643248

16530927

14346487

2184440

1912864

271576

239108

32468

28692

3776

3347

429

382

47

42

5

REDUCTION of DECIMALS

CASE. 1.

(1)

4)1·00

·25 Anſ.

2)1·0

·5 Anſ.

(3)

(3)
4)3·00
·75 Anſ.

(4)
3)1·0000
·3333, &c. Anſ.

(5)
12)7·0000
·5833 Anſ.

(6)
193)14·0000(·0725
1351
490
386
1040
965
75

(7)
$6\frac{3}{4}$
4
4)27·00
6·75 Anſ.

(8)
$8\frac{4}{12}$
12
12)100·000
Anſ. 8·333

(9)
3842)226·0000(·0588
19210
33900
30736
31640
30736
904

(10)
4806)2402·000(·0499
19224
47960
43254
47060
43254
3806

To reduce a decimal to a vulgar fraction, is no more than dividing by the greateſt common meaſure; the denominator of the decimal being ·10, 100, 1000, &c. as in example 1. $\frac{25}{100}$=in its loweſt terms, $\frac{1}{4}$ the vulgar fraction given.

CASE 2.

(1)
12)4·000
·333 Anſ.

(2)
6½
2
24 { 4)13·00
6) 3·250
·5416 Anſ.

(3)
12)10·000
·833 Anſ.

(4)
5½
2
24 { 4)11·00
6) 2·7500
·4583 Anſ.

(5)
36= { 6)6
6)1·000
·166 Anſ.

(6)
9½
2
72= { 6)19·000
12)3·166
·263 Anſ.

(7)
1760)220·00(·125 Anſ.
1760
4400
3520
8800
8800

(8)
1760)660·00(·375
5280
13200
12320
8800
8800

(9)
20)18·0
·9 Anſ.

(10)
s. *d.*
16 9
12
240)201.00(·83 Anſ.
1920
900
720
180

(11)
12)8·000
·666 Anſ.

(12)
lb. dw.
1=240)6·00(·025 Anſ.
480
1200
1200

(13)
112)14·000(·125 Anſ.
112
280
224
560
560

(14)
16 { 4)6·0
4)1·500
·375 Anſ.

(15)
t. gal.
1=252)70·00(·27 Anſ.
504
1960
1764
196

(16)
year days
1=365)90·0(·2465 Anſ.
730
1700
1460
2400
2190
2100
1825
275

(17)
day hours
1=24)9·000(·375 Anſ.
72
180
168
120
120

(18)
day min.
1=1440)8·000(·0055 Anſ.
7200
8000
7200
800

(19)
qt. p.
4 1
2
bar. pts.
1=256)9.000(·035 An.
768
1320
1280
40

(20)
acre poles
1=160)26·00(·162 An.
160
1000
960
400
320
80

CASE 3.

(1)
·333
12
inches 4·000 Anſ.

(2)
·5416
12
6·5000
4
2·0000 Anſ. 6½ in.

(3)
·833
12
inches 10·000 Anſ.

(4)
·4583
12
5·5000
4
2·0000 Anſ. 5½ inches

(5)
·166
6×6=36
1·000
6
6·000 inches Anſ.

(6)
·263
$\cancel{6}\times6=36$
1578
6
9·468
4
1·87½ Anſ. 9½ inc.

(7)
·125
1760
7500
875
125
yards 220·000 Anſ.

(8)
1760
·375
8800
12320
5280
yds. 660·000 Anſ.

(9)
·9
20
18·0 ſhillings Anſ.

(10)
·83
20
16·60
12
7·20
Anſ. 16*s*. 7*d*.

(11)
·666
12
oz. 8·000 Anſ.

(12)
·025
12
·300
20
dwt. 6·000 Anſ.

(13)

(13)
·125
112
250
125
125
lb. 14·000 Anſ.

(15)
252 gal.=1 tun
·27
1765
504
gal.68·05 Anſ.

(17)
·375
24
1500
750
hours 9·000 Anſ.

(19)
·035
256=pints in 1 bar.
210
175
70
pints 8·960 Anſ.

(14)
·375
16
oz. 6·000 Anſ.

(16)
.2465
365
12325
14790
7395
days 89·9725 Anſ.

(18)
·005
24
020
010
0·120
60
minutes 7·200 Anſ.

(20)
·162
160
9720
162
poles 25·920 Anſ.

EXTRACTION of the SQUARE ROOT.

(1)

```
     . .
     144(12 root
     1
    ---
22)  44
     44
    ---
```

(3)

```
      . .
      3456(58 root.
      25
     ------
108)  956
      864
     ----
       92
```

(5)

```
       .  .  .  .  .
       345678 0000(587·94 root
       25
      ---
108)   956
       864
      -----
1167)  9278
       8169
      -------
11749) 110900
       105741
      -------
117584) 515900
        470336
       -------
         45564
```

(2)

```
     . .
     1728(41 root.
     16
    ---
81)  128
      81
     ---
      47
```

(4)

```
      .  .  .
      49864(223 root
      4
     ------
42)   98
      84
     ----
443) 1464
     1329
     ----
      135
```

(6)

```
        .  .  .  .
        4567893(2137 root
        4
       ---
41)     56
        41
       ---
423)   1578
       1269
      -------
4267) 30993
      29869
      -------
       1124
```

(7)

(7)

```
  . . . . . . . . . .         ,
  123456789·0000000000(11111·11106 root
  1
 ---
21) 23
    21
    ---
221) 245
     221
     ----
2221) 2467
      2221
      -----
22221) 24689
       22221
       ------
222221) 246800
        222221
        -------
2222221) 2457900
         2222221
         --------
22222221) 23567900
          22222221
          -----------
2222222206) 13456790000
            13333333236
            -----------
              123456764
```

(8)

```
         .  .  .  .  .  .  .  .  .  .  .  .  .
       987654·32100000000000000000(993·807999006 roo
       81
       --
  189)1776
      1701
      ----
 1983)  7554
        5949
        ----
19863)  160532
        158944
        ------
1987607)   15881000
           13913249
           --------
19876149)   196775100
            178885341
            ---------
198761589)   1788975900
             1788854301
             ----------
198761598 0006)   1215990000000
                  1192569588003 6
                  -------------
                   234204119964
```

After you have proceeded by the common method till you have one figure more than half the number there is to be in the root, the reſt may be found by contractions in diviſion, ſee the following example.

```
     ·12345678912345678 9( 35136560606219953269435 root
        9
    65)334
       325
  701)  956
        701
   7023)25578
        21069
  70266) 450991
         421596
  702725) 3939523
          3513625
  7027306) 42589845
           42163836
 702731206)  4260096789
             4216387236
 70273121206)  437095530000
               421638727236
  702731212122) 1545680276400
                1405462424244
  702731212124) 140217852156
                 70273121212
                 69944730944
                 63245809090
                  6698921854
                  6324580908
                   374340946
                   351365606
                    22975340
                    21081936
                     1893404
                     1405462
                      487942
                      421638
                       66304
                       63245
                        3059
                        2810
                         249
                         210
                          39
                          35
                           4
```

SQUARE ROOT of VULGAR FRACTIONS

(1)
$\sqrt{\frac{9}{16}}=\frac{3}{4}$ the root.

(2)
$\sqrt{\frac{16}{25}}=\frac{4}{5}$ the root.

(3)
$\sqrt{\frac{36}{49}}=\frac{6}{7}$ the root.

(4)
$\sqrt{\frac{64}{81}}=\frac{8}{9}$ the root.

(5)
$\sqrt{\frac{144}{196}}=\frac{12}{14}$ the root.

(6)
$6\frac{1}{4}=\frac{25}{4}$ then $\sqrt{\frac{25}{4}}=\frac{5}{2}=2\frac{1}{2}$ the root.

SURDS.

(1)

Firſt $\frac{96}{120}=\frac{4}{5}$ in its loweſt terms; and $\frac{4}{5}$ reduced to a decimal=·8

```
       ·800000(·894 Anſ.
        64
       ----
  169)1600
       1521
       ----
 1784)  7900
        7136
        ----
         764
```

(2)

Firſt $\frac{3}{4}$ reduced to a decimal =·75 then

```
        38·7500(6·22 Anſ.
        36
        --
  122)  275
        244
        ---
 1242)  3100
        2484
        ----
         616
```

(3)

Firſt 86$\frac{1}{2}$ when reduced to a decimal=86·5

. .
86·50(9·3 Anſ.
81

183) 550
549

1

(5)
26(5$\frac{2}{31}$ root.
25

1

(4)

Firſt $\frac{9}{12}=\frac{3}{4}$ in its loweſt terms; and $\frac{3}{4}$ reduced to a decimal=·75 then

. . . .
462·7500(21·51 Anſ.
4

41) 62
41

425)2175
2125

4301) 5000
4301

699

USE of the SQUARE ROOT.

(1)

32
18

. .
256(24 Anſ.
32

576
4

44)176
176

(2)

20
12

. . .
240·00(15·49 inc.
1

25)140
125

304) 1500
1216

3089) 28400
27801

599

(3)

```
      (3)
   6
   4
  ---
   .  .
  24·00(4·898 Anſ.
  16
  ---
88) 800
    704
    ---
969) 9600
     8721
     ----
9788) 87900
      78304
      -----
       9596
```

```
      (4)
     18·5
     12·5
     ----
     925
    370
   185
   ------
   .   .   .
   231·25(15·2 in anſ.
   1
   ---
25)131
   125
   ---
302) 625
     604
     ---
      21
```

```
      (5)
   40
   30
  ---
   .  .
  1200·(34·6 Anſ.
   9
  ---
64)300
   256
   ---
686) 4400
     4116
     ----
      284
```

CASE 2.

(1)

```
 . .
 576(24 Anſ.
 4
 ---
44)176
   176
   ---
```

(2)

```
 .  .  .
 240·00(15·49 Anſ.
 1
 ---
25)140
   125
   ---
304) 1500
     1216
     ----
3089) 28400
      27801
      -----
        599
```

(3)

```
 .  .
 24·00(4·89 Anſ.
 16
 ---
88) 800
    704
    ---
969) 9600
     8721
     ----
      879
```

(4)

```
 .  .  .
 231·25(15·2 Anſ.
 1
 ---
25)131
   125
   ---
302) 625
     604
     ---
      21
```

CASE 3.

(1)

1 : 1·2732 :: 576
576

76392
89124
63660

. . . .
733·3632(27·09 dia.
4

47)333
329

4709) 43632
42381

251

(2)

355 : 452 :: ·7854
452

15708
39270
31416

355)355·0008(1 d.

(3)

1 : 1·2732 :: 38·5
38·5

63660
101856
38196

. . .
49·01820(7 inc. dia.
49

(4)

1 : 1·2732 :: 363·05
363·05

63660
381960
76392
38196

. . . . .
462·235260(21·499 inch [diam.
4

41) 62
41

424)2123
1696

4289) 42752
38601

42989) 415160
386901

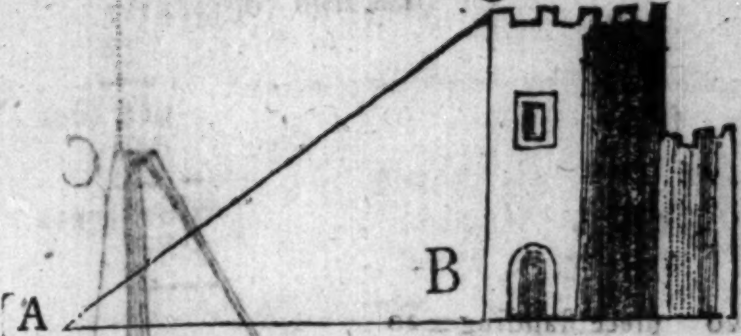
28259

CASE 4.

```
        (1)                                      (2)
     48      20                          52         48
     48      20                          52         48
    ----    ----                        ----       ----
    384     400                          104        384
   192                                  260        192
   ----                                 ----       ----
   2304                                 2704       2304
    400                                 2304
   ----                                 ----
   2704(52 yds.  Anſ.                   400(20 yards Anſ.
   25                                   4
   ---                                  ---
102) 204                               40) 00
     204
     ---

        (3)
     52      20
     52      20
    ----    ----
    104     400
    60
   ----
   2704
    400
   ----
   2304(4  yards Anſ.
   16
   ---
88) 704
    704
    ---
```

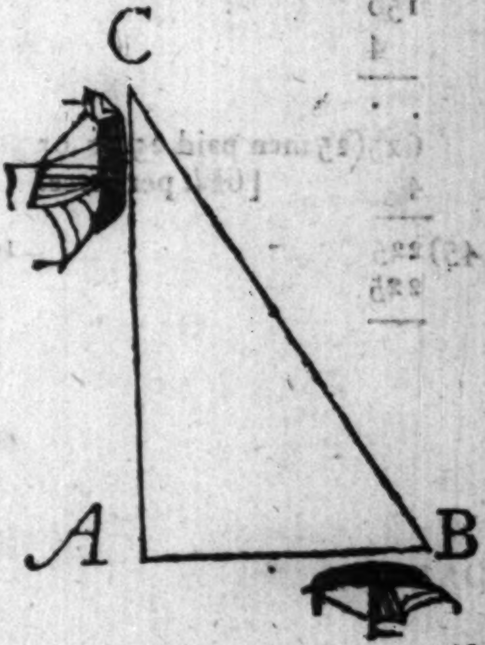
(4)



40 30
40 30
1600 900
900
. .
2500(50yds. A.
25

(5)

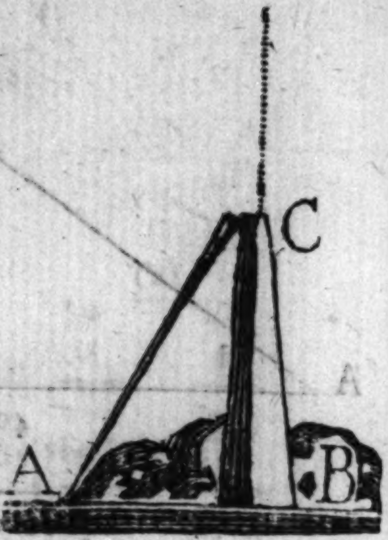
40 60
40 60
1600 3600
1600
. .
2000(44 lea. Anſ.
16
84)400
336
64



(6)

(6)

25 15
25 15
125 225
50
625
225
400(20 piece ſtanding=20
4 piece broken off=25
00 whole length=45
feet Anſ.



(7)

s. d.
13 0¼
12
156
4
625(25 men paid 25qrs. or
4 6¼*d.* per piece.
45)225
225

(8)

£. s. d.
11 5 4
20
225
12
2704(52 men paid 52*d.*
25 or 4*s.* 4*d.* each
102) 204
204

(9)

(9)

321489(567 men Anſ.
25
106) 714
636
1127) 7889
7889

(10)

24
16
384
14
5376(73·3 feet, quantity of light req.
49
143) 476
429
1463) 4700
4389
311

(11)

head = 22 length 30
bung = 26 half 15
15
ſum 2)48 225
half 24
24
96
48
576
225
801(28·3 diagonal line.
4
48)401
384
563) 1700
1689
11

EXTRAC-

EXTRACTION of the CUBE ROOT.

(1)

```
       .  .
       1728(12 the root.
       1
       ----
 304
  60    728
 364    728
        ---
```

Explanation 1. The Cube root of the firſt period is 1, which is ſet in the quote, and its cube 1 underneath the firſt period, and ſubtracted therefrom, then the next period 728 is brought down for a reſolvend.

2. The □ of 1×3=3 the diviſor which is contained in the reſolvend twice which per rule is 04 which put to the diviſor 3=304. then the laſt figure in the quote 2×30×1=60 and 60+304=364×2 the laſt figure in the quote =728 to be ſubtracted from the reſolvend and 0 remains; ∴ 12=the root, which cubed=1728 proof.

(2)

```
      .  .
      2197(13 root.
      1
      ------
 309
  90
 399) 1197
      1197
      ----
```

(3)

```
      .  .
      2744(14 root.
      1
      ------
 316
 120
 436) 1744
      1744
      ----
```

(4)

```
         .   .   .
         2985984(144 root.
         1
         ---
   436)  1985
         1744
         -------
 60496)  241984
         241984
         ------
```

(5)

```
          .   .   .
          75686967(423 root.
          64
          -------
   5044)  11686
          10088
          ----------
 532989)  1598967
          1598967
          -------
```

(6)

644972544(864 root.
512

20676)132972
124056

2229136) 8916544
8916544

(7)

50243409(369 root.
27

3276)23243
19656

398601) 3587409
3587409

(8)

12862247607(2343 root
8

1389)4862
4167

161476) 695247
645904

16447869)49343607
49343607

(9)

163039787847(5463
125

8116)38039
32464

884556) 5575787
5307336

89483949) 268451847
268451847

(10)

50023150823736(36846 root
27

3276)23023
19656

397504)3367150
3180032

40671376)187118823
162685504

4072219956) 24433319736
24433319736

(11)

(11)

94996712418949125(456285 root
64

5425)30996
27125

615636) 3871712
3693816

62408164) 177896418
124816328

6244648144) 53080090949
49957185152

624581159425) 3122905797125
3122905797125

(12)

94997087172214118016(4562856 root.
64

5425)30997
27125

615636) 3872087
3693816

62408164) 178271172
124816328

6244648144) 53454844244
49957185152

624581159425) 3497659092118
3122905797125

62458882498836) 374753294993016
374753294993016

(13)

(13)

```
        3·460000(1·51 Root.
        1
        ----
  475)2460
      2375
      ------
67951) 85000
       67951
       -----
       17049
```

(14)

```
          50375·533(36·9 root.
          27
          -----
    3276)23375
         19656
         ------
398601) 3719533
        3587409
        -------
         132124
```

(15)

```
          163040·819968(54·63
          125
          ----
    8116) 38040
          32464
          -------
  884556) 5576819
          5307336
          --------
9483949) 269483968
         268451847
         ---------
           1032121
```

(16)

```
             8151·613000(20·12
             8
             -----
   120601)  151613
            120601
            --------
12132364) 31012000
          24264728
          --------
           6747272
```

(17)

.012862268910(·2343 root.
8
1389)4862
4167
161476) 695268
645904
16447869) 49364910
49343607
21303

(18)

163·040000000(5·463 root.
125
8116) 38040
32464
884556) 5576000
5307336
89483949) 268664000
268451847
212153

To Extract the CUBE ROOT of VULGAR FRACTIONS.

(1)

$\sqrt[3]{\frac{8}{27}}=\frac{2}{3}$ the root.

(2)

$\sqrt[3]{\frac{27}{64}}=\frac{3}{4}$ the root.

(3)

$\sqrt[3]{\frac{512}{729}}=\frac{8}{9}$ the root.

(4)

$\sqrt[3]{\frac{27}{125}}=\frac{3}{5}$ the root.

(5)

Firſt $\frac{72}{243}=\frac{8}{27}$ then $\sqrt[3]{\frac{8}{27}}=\frac{2}{3}$ the root.

(6)

Firſt $\frac{108}{256}=\frac{27}{64}$ then $\sqrt[3]{\frac{27}{64}}=\frac{3}{4}$ the root.

(7)

Firſt $3\frac{3}{8}=\frac{27}{8}$ then $\sqrt[3]{\frac{27}{8}}=\frac{3}{2}=1\frac{1}{2}$ the root.

(8)

Firſt $91\frac{1}{8}=\frac{729}{8}$ then $\sqrt[3]{\frac{729}{8}}=\frac{9}{2}=4\frac{1}{2}$ the root.

THE

THE USE OF THE CUBE ROOT.

CASE 1.

(1)

$\dot{2}19\dot{7}$(13 inches Anſ.
1
399)1197
1197

(2)

$\dot{2}74\dot{4}$(14 inches Anſ.
1
436)1744
1744

CASE 2.

(3)

4 | 7
4 | 7
16 | 49
4 | 7

64 : 9 :: 343
9

$$64\begin{cases}8)\,3087{\cdot}000\\ 8)\;\;\;385{\cdot}875\end{cases}$$

lb. 48·234 Anſ.

(4)

80 | 100
80 | 100
6400 | 10000
80 | 100

512000 : 500 :: 1000000
500

512·000)500000·000(976·56 tons Anſ.
4608
3920
3584
3360
3072
2880
2560
3200
3072
128

```
                 (5)
           40  diameter given
           40
         ----
         1600
           40
       -------
89·1 : 64000 :: 100
          100
     --------          .   .    .
89·1)6400000·0 ( 71829·400(41·5 diam. requ. Anſ.
     6237          64
     ----         ----
     1630    4921)7829
      891          4921
     ----         -----
      7390 510475) 2908400
      7128         2552375
      ----         -------
      2620          356025
      1782
      ----
       8380
       8019
       ----
        3610
        3564
        ----
          46
```

20 the given depth
20

400
20

89·1 : 8000 :: 100
100

89·1)800000·0 (8978·600(20·78 depth req.An.
7128 8

8720 124249)978600
8019 869743

7010 12904444)108857000
6237 103235552

7730 5621448
7128

6020
5346

674

CASE 3.

(6)
5
5

25
5

125
2

250(6·29=6·3 nearly
216

11164) 34000
22328

170021)11672000
10530189

1141811

(7)
6·3
6·3

189
378

39 69
6·3

11907
23814

2)250·047

125·023(5·0 feet Anſ.
125

023

(8)

(8)

```
First 250
      250
    -----
    12500
    500
    -----
    62500
      250
  -------
  3125000
 125000
 --------
2)15625000
 ---------
  7812500)198 keel
  1
  ------
651)6812
    5859
    ------
112924)953500
       903392
       ------
        50108
```

```
Secondly 50
         50
       ----
       2500
         50
      -----
   2)125000
     ------
      62500(39 midſhip beam.
      27
     ------
3591)35500
      32319
      -----
       3181
```

```
Thirdly 30
        30
       ---
       900
        30
     -----
  2)27000
    -----
     13500(23·8 depth in the hold.
     8
    ----
1389)5500
     4167
     ------
164284)1333000
       1314272
       -------
         18728
```

CASE

C A S E 4.

(9)

4)108

27(3 Cube root
4
12 leſſer mean
3
36 greater mean.

As 4 : 12 :: 36
12
4)432
108 proof.

(10)

4)500

125(5 Cube root.
4
20 Leſſer mean.
5
100 greater mean.

As 4 : 20 :: 100
20
4)2000
500 proof.

To Extract the Roots of Powers in General.

(1)

75686967(423 root.
$64=4^3$
$4^2\times3=48)$116 dividend
$74088=42^3$
$42^2\times3=5292)$ 15989 ſecond dividend
75686967

(2)

$32\dot{0}155\dot{8}704\dot{1}$(423 root

$256 = 4^4$

$4^3 \times 4 = 256$) 641 dividend

3111696

$42^3 \times 4 = 296352$) 898627 ſecond dividend

22015587041

(3)

$135\dot{4}2593\dot{3}1834\dot{3}$(423 root

$1024 = 4^5$

$4^4 \times 5 = 1280$) 3302 dividend

$130691232 = 42^5$

$42^4 \times 5 = 15558480$) 47347011 ſecond dividend

13542593318343

(4)

$572\dot{8}51697\dot{3}65908\dot{9}$(423 root

$4096 = 4^6$

$4^5 \times 6 = 6144$)16325 dividend

$5489031744 = 42^6$

$42^5 \times 6 = 784147392$) 2394852296 ſecond dividend

5728516973659089

(5)

(5)

24231626798577794647(423 root

$16384=4^7$

$4^6\times7=28672$) 78476 dividend

$230539333248=42^7$

$42^6\times7=38423222208$) 117769347377 ſecond dividend

24231626798577794647

(6)

10249978135798471356 81(423 ro

$65536=4^8$

$4^7\times8=131072$)359637 dividend

$9682651996416=42^8$

$42^7\times8=184431466598 4$) 5673161393824 ſecond divid.

1024997813579847135681

(7)

(7)

$$\begin{array}{rl}
 & 43357\dot{4}07514427\dot{5}33839306\dot{3}(423 \\
 & \underline{262144=4^9} \\
4^8\times9=589824) & 1714300 \text{ dividend} \\
 & \underline{406671383849472=42^9} \\
42^8\times9=87143867967744) & 268926912947933 \text{ ſecond div.} \\
 & \underline{433574075144275338393063}
\end{array}$$

The extraction of roots of high powers, by this general rule, will be found a tedious operation: I would therefore adviſe the tutor to learn his pupils only the ſquare and cube roots, as they are the moſt uſeful; and thoſe that wiſh to be inſtructed further in converging ſeries, I would recommend the uſe of logarithims, which may be taught at proper intervals, when they are arrived thus far in common Arithmetic. The compleateſt and beſt tables I have yet ſeen, are thoſe lately publiſhed, by the learned Dr. Hutton, F. R. S. which I adviſe the ſtudent to make uſe of, as I have reaſon to believe, they are the moſt correct of any yet extant.

The SINGLE RULE of THREE, in DECIMALS.

(1)

Firſt $\frac{1}{4}=\cdot25$, $\frac{2}{5}=\cdot4$£. and $2\frac{1}{2}=2\cdot5$ yards; then

$$\begin{array}{lcccccc}
 & \textit{yds.} & & \textit{£.} & & \textit{yds.} \\
\text{As} & \cdot25 & : & \cdot4 & :: & 2\cdot5 \\
 & & & & & \underline{\cdot4} \\
 & & & & \cdot25) & 1\cdot00(4\text{£. Anſ.} \\
 & & & & & \underline{100}
\end{array}$$

(2)

(2)

£. *yds.* £.
4 : 2·5 :: ·4
·4
4)1·00
·25=$\frac{1}{4}$ yd. Anſ.

(4)

£. £. £.
100 : 4·5 :: 240
4·5
1200
960
1|00)10·800
£. 10·80
20
s. 16·00
10£. 16*s.* Anſ.

(6)

days £. *days*
300 : 52 5 :: 10
10
3|00)5·250
1·75=1£. 15*s.* Anſ.

(3)

Firſt $4\frac{3}{4}$=4·75 yds. 4£. 10*s.* =4·5£. and $11\frac{1}{2}$=11·5yds.

yds. £. *yds.*
As 4·75 : 4·5 : 11·5
4·5
575
460
4·75)51·75(10·89 [Anſ.
475
4250
3800
4500
4275
225

(5)

Firſt 1£. 15*s.*=1·75; 52£. 10*s.*=52·5

£. *days* £.
1·75 : 10 :: 52·5
10
1·75)525·00(300 da
525

(7)

(7)

£. gal. £.
39·6 : 72 :: 110
110
39·6)7920·0(200 gallons An.
792

(8)

gals. £. gals.
200 : 110 :: 72
72
220
770
2·00)79·20
39·6=39*l.* 12*s.* Anſ.

(9)

yds.
5·5=1 perch
4
22·0=4 perches

yds. yds. yds.
22 : 220 :: 16·5 *
22
440
440
16·5)4840·0(293·33 yards Anſ.
330
1540
1485
550
495
550
495
550
495
55

(10)

£. *ſhip.* £.
249 : ·1666 :: 747
747

⅙=·1666 &c.
11662
6664
11662

249)124·4502(·4998=½ of her Anſ.
996

2485
2241

2440
2241

1992
1992

(11)

feet. £. *feet.*
40·5 : 1·75 :: 24·5
10×5=50

2450
5

1225·0
1·75

61250
85750
12250

40·5)2143·750(52·932*l.*=52*l* 18*s.* 7½*d.*
[Anſ.

(12)

(12)

c. £. *c.*
3·5 : 5·25 :: 2·25
5
11·25
5·25
5625
2250
5625
3·5)59·0625(16·875=16*l.* 17*s.* 6*d.* Anſ
35
240
210
306
280
262
245
175
175

(13)

£. *cwt.* £.
16·875 : 11·25 :: 5·25
5·25
5625
2250
5625
16·875)59·0625(3·5=3½ cwt An.
50625
84375
84375

(14)

yds. *yds.* *yds.*
2 : 2·5 :: ·75 *
2
———
·75)5·0000(6·66 yards Anſ.
450
———
500
450
———
500
450
———
50

(15)

yd. *yd.* *yd.*
6 66 : ·75 :: 2·5 *
6 66
———
450
450
450
———
2·5)4·9950(1·99=2 yds. nearly Anſ.
25
———
249
225
———
245
225
———
20

(16)

1 deal	50 deals
14 feet long	20 feet long
14	1000
11 inches broad	11 inches broad
154	11000
6 half inches thick	5 half inches thick

lb.

924 : 120 :: 55000

120

924)6600000(7142·857 lb. Anſ.

6468

1320

924

3960

3696

2640

1848

7920

7392

5280

4620

6600

6468

132

or thus:

1	50
14	20
14	1000
6	5

84 : 120 :: 5000

120

84 { 12)600000

7) 50000

lb. 7142·857 Anſ.

RULE of FIVE in DECIMALS.

(1)

£. £. £.
✠ 100 : 5 :: 700
✠ 12 mon. —— 9 month
12·00 6300
5
12)315·00
£. 26·25=26*l.* 5*s.*

£. £. £.
✠ 700 : 26·25 :: 100
✠ 9 mo. —— 12 mo.
63·00 1200
26·25
63 { 9)315·0000
7) 35
£. 5 Anſ.

(3)

days. *rods.* *days.*
✠ 13 —— 25·5 —— 28
✠ 4 men —— —— 36 men
52 168
84
1008
25·5
5049
5040
2016
52)25704·0(494·3 rods Anſ.
208
490
468
224
208
160
156
4

(4)

(4)

w. £. *w.*
✠ 42——240——92
✠ 12 perſons —— 28 perſons

504

736
184

2576
240

103040
5152

504)618240(1226·666=1226*l.* 13*s.* 4*d.* Anſ.

(5)

ſ. *t.* *ſ.*
✠ 6 : 3 :: 420
1·5 da. —— 9 da.

6
9

54

420
3

1260
1·5

6300
1260

54 { 9) 1890·0
{ 6) 210

Anſ. 35 taylors.

(6)

cwt. *d.* *cwt.*
✠ 1 : 6·5 :: ·5
✠ 20 miles — 100 miles

2·0

500
6·5

2)325·00

12)162·5

s. 13·5416=13 6½

SINGLE

SINGLE FELLOWSHIP.

(1)

£.
A puts in 96
B 128
—— £. gain
224)28·000(·125 the common multiplier.
224

560	96	128	A gains 12£.
448	·125	·125	B 16
1120	480	640	proof 28£.
1120	192	256	
	96	128	
	12·000	16·000	

(2)

1500
900
600
3000)600·0(·2 the common multiplier.
6000
Then 1500×·2=300 A's gain
900×·2=180 B's gain
600×·2=120 C's gain
proof £. 600

(3)

	£.
A's ſtock	2400
B's	9600
C's	4000

£. loſt
16000)1600·0(·1 common multiplier.
16000

Then 2400×·1=240 A's loſs
9600×·1=960 B's do.
4000×·1=400 C's do.
proof £. 1600

(4)

1 6)480
2
3 80 common multiplier
* 6

£.
Then 1×80=80= 1ſt perſons ſhare
2×80=160 2nd ditto
3×80=240 3rd ditto
proof £. 480

---

* In ſuch queſtions, any number may be taken at pleaſure, that have the ſame proportions amongſt themſelves as thoſe propoſed in the queſtion.

(5)

£.
A's debt 520
B's 680 } 2000)920·00)·46 common multiplier.
C's 800
8000

12000
12000

£. s.
Then 520×·46=239·20=239 4 A's due
680×·46=312·80=312 16 B's due } Anſ.
800×·46=368·00=368 0 C's due

proof £. 920 0

(6)

£. £. £.
A's adventure 360
B's 480 } 1940)970·0(·5 common multiplier.
C's 500 9700
D's 600

£. £.
Then 360×·5=180 A's ſhare
480×·5=240 B's ditto
500×·5=250 C's ditto
600×·5=300 D's ditto

proof £. 970

(7)

(7)

Firſt 180+240+250+300=970 £. their whole gain.
And 970£.÷1940£. =·5 the common diviſor.

£.
Then 180÷·5=360 A's ſtock
240÷·5=480 B's ſtock
250÷·5=500 C's ſtock
300÷·5=600 D's ſtock

* proof £. 1940

(8)

Firſt $\frac{3}{7}+\frac{3}{8}=\frac{24}{56}+\frac{21}{56}=\frac{45}{56}=$ A+B's part; Then $\frac{56}{56}-\frac{45}{56}=\frac{11}{56}$ C's part of the ſhip; then by neglecting the denominators the proportion is

$$\begin{array}{l} \quad \text{£.} \\ \text{As } 11 : 120 :: \end{array} \left\{\begin{array}{llllll} \text{£.} & & \text{£.} & s. & d. & \\ 24 : & 261{\cdot}8181 = & 261 & 16 & 4\frac{1}{4} & \text{A paid} \\ 21 : & 229{\cdot}0909 = & 229 & 1 & 9\frac{3}{4} & \text{B paid} \\ 11 : & 120{\cdot}0000 = & 120 & 0 & 0 & \text{C paid} \\ \hline & \text{Anſ. £.} & 610 & 18 & 2 & \end{array}\right.$$

---

* It is evident that all the ſhares added together will be equal to the whole gain or loſs, which is a proof to the work, yet if the tutor thinks proper, he may direct his pupils to vary the operations as in the above example.

DOUBLE FELLOWSHIP.

(1)

Firſt 96×4=384 A's ſtock and time
128×6=768 B's ſtock and time

1152)24·00000(·02083 common multiplier

Then 384×·02083=7·99872 A's gain
768×·02083=15·99744 B's gain

proof £. 23·99616=24 £. very nearly

(2)

£. mo.
Firſt 8÷4=2
16÷6=2·66

£.
4·66 : 224 :: 2 : 96 A's ſtock
4·66 : 224 :: 2·66 : 128 B's ſtock

proof £. 224

(3)

Firſt 240×8=1920=A's ſtock and time
500×4=2000=B's ditto
200×5=1000=C's ditto

4920)369·000(·075 common multiplier

Then 1920×·075=144£. A's ſhare of the gain
2000×·075=150 B's ditto
1000×·075= 75 C's ditto

proof £. 369

(4)

mo.
11
9
—
£. *mo.* *£.*
20 : 1200 :: 11 : 660 A's ſtock
20 : 1200 :: 9 : 540 B's ſtock

proof £. 1200

(5)

Firſt 50×4=200 } 590 A's products
130×3=390 }
60×6=360 } 440 B's ditto
20×4= 80 }
100×6=600 } 850 C's ditto
50×5=250 }

ſum 1880)362·0(·1925 common multiplier
Then 590×·1925=113·575 A's ſhare
440×·1925= 84·700 B's ſhare
850×·1925=163·625 C's ditto

proof £. 361·900=362£. very nearly

(6)

Firſt 64·5×4·5 =290·25 A's ſtock and time
78·75×6 =472·5 B's ditto
112·7 ×8·75=986·125 C's ditto
125·25×5·25=657·5625 D's ditto

ſum £. 2406·4375
2406·4375)108·91875(·045261 common multiplier
Then 290·25 } ×·045261= { 13·1370 A's gain
472·5 } { 21·3859 B's gain
986·125 } { 44·633 C's gain
657·5625 } { 29·762 D's gain

£. *s.* *d.*
proof £. 108·9179=108 18 4½

SIMPLE INTEREST.

(1)

£.
364 principal
·05 ratio
18·20=18*l.* 4*s.* Anſ.

(2)

£.
486 principal
·05 ratio
24·30
5 No. of years
£. 121·5=121*l.* 10*s.* Anſ.

(3)

£.
884
7
6188
·05
309·40=309*l.* 8*s.* Anſ.

(4)

£.
1001
6
6006
·045
30030
24024
270·270=270*l.* 5*s.* 4¾*d.* An

(5)

£.
1205
·5
602·5
·04
24·100=24*l.* 2*s.* Anſ.

(6)

£.
640·4166
7
4482·9162
·05
224·145810=224*l.* 2*s.* 11*d.*

(7)

(7)

£.

9640·833

4·75

48204165

67485831

38563332

45793·95675

·05

£. 2289·6978375=2289*l.* 13*s.* 11½*d* Anſ.

(8)

·0001369863 intereſt of 1*l.* for 1 day

641 principal

1369863

5479452

8219178

878082183

50 number of days

4·3904109150=4*l.* 7*s.* 9½*d.* An.

(9)

·00012328767

2000

24657534

9×7=63 days

221917806

7

15·53424642=15*l.* 10*s.* 8*d.* Anſ.

(10)

·00010958904
5800·83

32876712
87671232
87671232
54794520

6357073909032
260

38142443454192
12714147818064

165·2839216348320 intereſt
58·00·83 principal

£ 5966·1139216348320=5966*l.* 2*s.* 4*d.* Anſ.

(11)

·0001369863
563·627

9589041
2739726
8219178
4109589
8219178
6849315

772091773101
265

3860458865505
4632550638606
1544183546202

£. 20·4604319871765=20*l.* 9*s.* 2½*d.* Anſ.

Note. Theſe examples thus far, are all proved by ſimple intereſt in whole numbers.

(12)

(12)
years.
5 time
·04 ratio
·20)12·00(60£. Anſ.
120
00

(13)
4 years
·05 ratio
·20)124·00(620*l.* Anſ.
120
40
40
00

(14)
3×·05=·15 product of ratio and time
15 { 5)69·675
3)13935
464·5=464*l.* 10*s.* [Anſ.

(15)
4·5×·04=·18 product
·18 { 2)58·725
9)293625
326·25=326*l.* 5*s.* A.

(16)
·04 ratio
5 time
·20
+1·
1·20)72·00(60*l.* Anſ.
720
00

(17)
·05
4
·20
1·
1·20)744·00(620*l.* Anſ.
720
240
240
00

(18)

·05
3
·15
1·
1·15)534·175)464·5=464*l.* 10*s.* Anſ.

(19)

·04
4·5
·180
1·
1·180)384·975(326·25=326*l.* 5*s.* Anſ.

(20)

principal 60
ratio ·04
2·40)12·00(5 years Anſ.
1200

(21)

£.
620
·05
31·00)124·00(4 years Anſ.
124·00

(22)

£.
464·5
·05
23·225)69·675(3 years Anſ.
69675

(23)
£.
326·25
·04
13·0500)58·7250(4·5=4$\frac{1}{2}$ years Anſ.
522000
652500
652500

(24)
£. £.
60 72 amount
·04 60 principal
2·40) 12·00(5 years Anſ.
1200

(25)
£. £.
620 744
·05 620
31·00)124·00(4 years Anſ.
12400

(26)
£. £.
464·5 534·175
·05 464·5
23·225)69·675(3 years Anſ.
69675

(27)
£.
326·25 384·975
·04 326·25
13·0500) 58·7250(4·5 years [Anſ.
522000
652500
652500

(28)
£.
60 principle
time 5 years
—— intereſt
300)12·00(·04=4 pr. ct.
1200

(29)
620
4
2480)124·00(·05=5 pr. ct.
12400

(30)

(30)

464·5
3
1393·5)69·675(·05=5 per ct.
69675

(31)

326·25
4·5
163125
130500
1468·125)58·72500(·04=4 per cent.
5872500

(32)

principal 60 72 amount
time 5 60 principal
300)12·00(·04=4 per cent. Anſ.
1200

(33)

620 744
4 620
2480)124·00(·05=5 per cent. Anſ.
12400

(34)

464·5 534·175
3 464·5
1393·5) 69·675(·05=5 per cent.
69675

```
   326·25          (35)
     4·5
  ———————
  163125   384·975
  130500   326·25
  ——————   ———————
1468·125) 58·72500(·04=4 per cent.
           5872500
          ————————
```

The purchaſing annuities by ſimple intereſt is a matter of ſpeculation, it being not only cuſtomary, but alſo moſt equitable, to allow compound intereſt; therefore it is quite unneceſſary it ſhould be inſerted in a book intended for real uſe.

DISCOUNT.

```
ratio ·05        (1)
time   1
     ————
      ·05
    + 1·
     ————
     1·05 amount of 1l. for the given time.
     ————
      120
      ·05
    —————
     6·00 intereſt of the debt
     ————
          1·05 : 1 :: 6
                 6
      1·05)6·00000(5·714=5l. 14s. 3¼d.
            525
            ———
             750
             735
             ———
              150
              105
              ———
               450
               420
               ———
                30
```

(2)

(2)

.05×1+1=1·05 amount of 1*l.* for the given time.
and 50×·05×1=2·50 intereſt of the debt: then
As 1·05 : 1 :: 2·50
1

£. s. d.
1·05)2·5000(2·38=2 7 7¼ diſct.
210

400
315

850
840

10

(3)

Firſt ·05×1+1=1·05 amount of 1*l.* for the given time.
and 200×·05×1=10·00 intereſt of the debt: then
As 1·05 : 1 :: 10
10

£. s. d.
200 0 0 principal
1·05)10·000000(9·5238= 9 10 5½ diſcount
945
Anſ. £. 190 9 6½ preſent mon.

550
525

250
210

400
315

850
840

10

(4)

Firſt $\cdot05\times\cdot25+1=1\cdot0125$ amount of 1*l.* for the given time, and $36\times\cdot05\times\cdot25=\cdot45$ intereſt of the debt; then

As 1·0125 : 1 :: ·45
1

£. *s.* *d.*
36 0 0 princip
1·0125)·4500000(·444= 0 8 10½*d.* diſ.
40500
£. 35 11 1½ p.m.

45000
40500

45000
40500

4500

(5)

Firſt $\cdot045\times3+1=1\cdot135$ amount of 1*l.* for the given time, and $573\cdot8\times\cdot045\times3=77\cdot463$ intereſt of the debt; then

As 1·135 : 1 :: 77·463 £. *s.* *d.*
1·135)77·463000(68·249=68 4 11¾ diſcount
6810

9363
9080

2830
2270

5600
4540

10600
10215

385

(6)

(6)

Firſt ·04375×175+1=1.0765625 amount of 1*l.* for the time, and 130×·04375×1·75=9·953125 intereſt of the debt; then As 1·0765625 : 1 :: 9·953125

	£.	s.	d.	
	£. 130	0	0	princip.
1·0765625)9·9531250000(9·245=	9	4	10¾	diſcount
	£. 120	15	1¼	preſ. mo.

96890625

26406250
21531250

48750000
43062500

56875000
53828125

3946875

(7)

Firſt ·05×·2+1=1·01 amount of 1*l.* for the given time, and 399·666×·05×·2=3·99666 intereſt of the debt;
1·01 : 1 :: 3·99666

	£.	s.	d.	
	£. 399	13	4	principal
1·01)3·99666(3·957=	3	19	1½	diſcount
	£. 395	14	2½	preſent wor

303

966
909

576
505

716
707

9

COM-

COMPOUND INTEREST.

(1)

1·05
1·05
525
105
1·1025
1·05
55125
11025
1·157625
50
57·881250=57*l.* 17*s.* 7½*d.* the amount

(2)

1·05
1·05
525
105
1·1025
1·05
55125
11025
1·157625
1·05
5788125
1157625
1·21550625
100
121·5506250=121*l.* 11*s.* 0½*d.* Anſ.

(3) £.
100 principal
·05
2)5·00
2·5
+100
102·5=1ſt half year's amount
·05
2)5·125
2·5625
+102·5
105·0625=2nd half year's amount
·05
2)5·253125
2·6265625
+105·0625
107·6890625=3d half year's amount
·05
2)5·384453125
2·6922265625
+107·6890625
110·3812890625=4th half year's amount
·05
2)5·519064453125
2·7595322265625
+110·3812890625
113·1408212890625=5th half year's amount
·05
2)5·657041064453125
2·8285205322265625
+113·1408212890625

Anſ. £. 115·9693418212890625=115*l.* 19*s.* 4½*d.* (4)

(4) £.
100 principal
·05
4)5·00
1·25
+100
101·25=1ſt qr's amount
·05
4)5·0625
1·2656
+101·25
102·5156=2nd qr's amount
·05
4)5·125780
1·281445
+102·5156
103·797045=3d qr's am[illegible]t
·05
4)5·18985225
1·29746306
+103·797045
105·09450806=4th qr's amount
·05
4)5·2547254030
1·3136813507
+105·09450806
106·4081894107=5th qr's amount
·05
4)5·320409470535
1·330102367633
+106·4081894107
Anſ. £. 107·738291778333=107*l.* 14*s.* 9*d.*

```
                   (5)
                  1·04
                  1·04
                ------
                   416
                 104
                ------
                1·0816
                  1·04
               -------
                 43264
               10816
               -------
              1·124864
                  1·04
             ---------
               4499456
             1124864
             ---------
            1·16985856
                  1·04
           -----------
             467943424
           116985856
           -----------
          1·2166529024
                   450
         -------------
          608326451200
         48666116096
         -------------
         547·4938060800 amount in 5 years
        —450            principal
         -------------
Anſ. £. 97·4938060800=97l. 9s. 11½d. inte.
```

ARITHMETICAL PROGRESSION.

PROBLEM 1.

(1)

56 greater extreme
2 leſſer do.

58 ſum
19 number of terms

2)1102

Anſ. 551 ſum of the ſeries

(2)

33
3

36
11

2)396

Anſ. 198

(3)

27
3

30
7

2)210

2|0)10|5

Anſ. £. 5 5

(4)

60
1

61
60

2)3660

1830=1m, 70yds. Anſ.

PROBLEM 2.

(1)

19 56
1 2

18) 54(3 common diff.
54

(2)

11 33
1 3

10) 30

3 Anſ.

(3)

7 27
1 3
6) 24
4ſ. Anſ.

(4)

60 60
1 1
59) 59
1 yd. Anſ.

PROBLEM 3.

(1)

56
2
2)54
18
1
19 Anſ.

(2)

33
3
3)30
10
1
11 Anſ.

(3)

27
3
4)24
6
1
7 yards Anſ.

(4)

60
1
1)59
59
1
60 Anſ.

PROBLEM 4.

(1)	(2)	(3)
11 number of terms	19	7
1	1	1
10	18	6
3 difference	3	4
30	54	24
33 laſt term	56	27
Anſ. 3 firſt term	2 Anſ.	3s. Anſ.

GEOMETRICAL PROGRESSION.

PROBLEM 1.

(1)

65611
3
196833
1
ratio 3—1=2)196832
98416 Anſwer

(2)	(3)
8192	2048
2	2
16384	4096
2	1
ratio 2—1=1)16382	ratio 2—1=1)4095
16382 Anſ.	4095 Anſ.

(4)

(4)

32768
4
131072
2
ratio 4—1=3)131070
4)43690 ſum of the ſeries
12)10922½
2|0) 91|0 2
£. 45 10 2½ Anſ.

PROBLEM 2.

(1)

First { 0. 1. 2. 3. 4. 5. indices
1. 2. 4. 8. 16. 32. terms
And 4+4=8 the number of terms leſs 1.
Alſo 16×16=256£. the Anſ.

(2)

First { 1. 2. 3. 4. 5. 6. 7. indices
2. 4. 8. 16. 32. 64. 128 terms
Then 7+6=13 number of terms
And 128×64=8192£. the Anſwe.

(3)

First { 0. 1. 2. 3, 4. 5. 6.
1. 2. 4. 8. 16. 32. 64.
Then 6+5=11 the number of terms leſs 1.
And 64×32=2048*s.*=102*l.* 8*s.* the laſt payment
Then 2048—1=2047+2048=4095*s.*=204*l.* 15*s.* the debt

(4)

(4)

0. 1. 2. 3. 4.
2. 8. 32. 128. 512
128
4096
1024
512
firſt term 2)65536
£. 32768 eldeſt's fortune
4
131072
2
ratio 4—1=3)131070
Anſ. £. 43690 whole eſtate

There are other problems which have been propoſed by ſome Authors, but they require the extraction of roots of very high powers, I ſhall omit them in this place, as being too troubleſome to ſolve by common arithmetic, but very eaſy by logarithms; therefore, thoſe gentlemen, whoſe inclinations, or ſituations in life, requires them to be made proficients in the extraction of roots, and ſeveral other neceſſary caſes in intereſt, annuities, &c. I would recommend the tutor to learn ſuch gentleman the logarithmic art, as it ſupplies the defects of common arithmetic with ſimplicity and elegance.

PERMU-

PERMUTATION.

(1)	(2)
1	1
2	2
2	2
3	3
6	6
4	4
24	24
5	5
120	120
6	6
720	720
7	7
5040	5040
8	8
Anſ. 40320 changes	40320
	9
	Anſ. 362880 days

(3)

(3)

1
2
2
3
6
4
24
5
120
6
2)720 poſitions
Anſ. 360 days to ſtay

(4)

1
2
2
3
6
4
24
5
120
6
Anſ. 720 changes

SINGLE POSITION.

(1)

Suppoſe A paid 60*l.*
then B muſt pay 120
and C 480
ſum 660
Then as 660 : 60 :: 440
60
£.
660)26400(40 A's ſhare
conſequently 40×2=80 B's ſhare
and 80×4=320 C's ſhare
£. 440 proof

(2)

$\frac{1}{2}$ of 60 crowns $=30$
$\frac{1}{3}$ $=20$
$\frac{1}{5}$ $=12$

ſum $=62$ which ſhould $=60$

As 62 : 60 :: 30 : $29\frac{2}{62}$ A's ſhare
62 : 60 :: 20 : $19\frac{22}{62}$ B's ſhare
62 : 60 :: 12 : $11\frac{38}{62}$ C's ſhare

60 proof

(3)

Suppoſe he had 120*l.*

Then $\frac{1}{3}$ of it is 40
$\frac{1}{4}$ of it is 30
and $\frac{1}{5}$ is 24

their ſum is 94
which taken from 120

leaves 26

proof

$\frac{1}{3}$ of 480 is 160
$\frac{1}{4}$ is 120
$\frac{1}{5}$ is 96

their ſum 376
taken from 480

leaves 104 £.

Then as 26 : 104 :: 120
120

26)12480(480 Anſ.
104

208
208

0

(4)

(4)

Suppoſe he lent 5*l*.
5
·25
20
5·000 intereſt for 1 year
12 years
3 0 intereſt for 12 years
5 principal
8 amount

£. £. £.
Then as 8 : 5 :: 500
5
8)2500
£. 312 10*s*. Anſ.

£. *s*.
312 10
5
15·62 10
20
12·50
12
6·00

£. *s*. *d*.
15 12 6 intereſt for 1 y.
12
187 10 0 do. for 12 years
312 10 0 principal
£. 500 0 0 proof

(5)

Suppoſe 24 days
As 12 : 1 :: 24 : 2 by A
8 : 1 :: 24 : 3 by B
6 : 1 :: 24 : 4 by C
ſum = 9 by A, B, C,

Then as 9 : 24 :: 1
1
9)24

Anſ. $2\frac{2}{3}$ days by A, B, and C working together.

DOUBLE POSITION.

(1)

First, ſuppoſe he had 12
the $\frac{1}{2}$ is 6
$\frac{1}{3}$ is 4
$\frac{1}{4}$ is 3

ſum 25
ſhould be 900

1ſt error —875
2nd ſup. 24

3500
1750

errors { 875 21000
errors { 850 10200

25)10800(432 Anſ.
100

80
75

50
50

Second, ſuppoſe 24
the $\frac{1}{2} = 12$
$\frac{1}{3} = 8$
$\frac{1}{4} = 6$

ſum 50
ſhould be 900

2nd error —850
1ſt ſup. 12

10200

he hath 432 now left
the $\frac{1}{2}$ is 216
$\frac{1}{3}$ is 144
$\frac{1}{4}$ is 108

900 proof

(2)

(2)

	300*l.*		300*l.*
Suppoſe B's ſhare	80	Sup. B=	100
then A's ſhare is	220	A=	200
diff.	140	diff.	100
ſhould be	72	ſhould be	72
1ſt error +	68	2nd error +	28
2nd ſup.	100	1ſt ſup.	80
1 product	6800	2 product	2240
	2240		

68—28=4|0)456|0

114= B's ſhare

300

diff. 186=A's ſhare

£. 72 proof (3)

Firſt, ſuppoſe A	240*l.*	Second ſuppoſe	260*l.*	232*l.*
+	50		50	50
B had left	290		310	282
+	50		50	50
B had at firſt	340		360	332
+	44		44	44
B has now	384		404	376 B's m.
A has left	196		216	188
double	392		432	376
1ſt error +	8	2nd error +	28	proof
2nd ſup.	260	1ſt ſup.	240	
1ſt pro.	2080		1120	
			56	
		28	6720	2nd product.
		8	2080	
			2|0)464|0	
			£. 232	A's money (4)

(4)

d.

Firſt, Suppoſe A worked 10 days at 32*d.* per day = 320
Then B worked 20 days at 26*d.* = 520

ſum 840
ſhould be 3*l.* 14*s.* = 888

1ſt error — 48

Second, Suppoſe A worked 15 days at 32*d.* = 480
then B worked 15 days at 26*d.* = 390

ſum 870
ſhould be 888

2nd error — 18

1ſt error	48	2nd error—	18
2nd ſup.	15	1ſt ſup.	10
	720		180

48 720
18 180

3|0)54|0

18 days A } Anſ.
12 B

ſum 30

d. d.
18 days at 32 = 576
12 26 = 312

proof 888 = 3*l.* 14*s.*

(5)

First, Suppoſe A owes 30*l*.
then B owes 70
100

Then if B owes 70*l*.
C owes 90
160.

But A's 30*l*.
C's 90
ſum 120
ſhould be 140
1ſt error— 20

Second, Suppoſe A owes 52*l*.
Then B owes 48*l*.
100

Then if B owes 48*l*.
C owes 112
160

But A's 52*l*.
C's 112
ſum 164
ſhould be 140
2d error +24
1ſt ſup. 30
720

2nd ſup. 52
1ſt error 20
1040

errors {24, 20}
1040
720

44)1760(40*l*. A's debt
176 60 B's do.
— 100 C's do.
0 —
200 ſum
} Anſ.

A's 40+B's 60=100*l*. B's 60+C's 100=160*l*. A's 40+C's 100=140*l*. proof.

(6)

Firſt, Sup. 1ſt letter's place is	9	2d ſup. 1ſt let. place is	6
then the ſecond is	3	then the ſec. is	2
and the third is	46	and the third is	31
ſum	58	ſum	39
ſhould be	20	ſhould be	20
1ſt. error +	38	2nd. error +	19
2d. ſup.	6	1ſt. ſup.	9
	228		171

38 228
19 171

19 57(3 the firſt letters place
57

First letters place = 3 = C
the ſecond = 1 = A
the third = 16 = P
∴ Cap is the ornament

ſum 20 proof

MISCELLANEOUS QUESTIONS.

(1)

80 leaſt number
28 difference

108 greater number
80

Anſ. 188 ſum of both

(2)

20 left.
21, 42, 84 ſtolen the 3, 2, 1 nigh

Anſ. 167 ſheep at firſt

(3)

(3)

From the creation to the flood		1656
To the building of Solomon's temple		1336
To Mahomet		1630
		4622
Mahomet after Chriſt	—	622
Anſ. A M		4000

(4)

$$\left.\begin{array}{r}1787-1765=22+24=46\text{ C's}\\ 17+46=63\text{ A's}\\ 13+63=76\text{ B's}\end{array}\right\}\text{ Age}$$

(5)

Diſtance of the ſun from the earth		81000000
Diſtance of the Earth and Moon	+	240000
From each other in an eclipſe of the moon		81240000
		81000000
		—240000
From each other in an eclipſe of the ſun		80760000

(6)

Temple built A M	3000	Chriſt born A M	4000
Troy before	—443	Rome built before	—744
Troy built A M	2557	A M	3256
London after	+ 260	Carthage built bef.	—113
London built A M	2817	A M	3143
		London built	2817

London older than Carthage 326 years

(7)

	£.	s.	d.
From the whole debt	16	13	0
Take the difference of their payments	—6	13	3
	2)9	19	9
The half is what A has now to pay	4	19	10½
A has paid more than B	+6	13	3
Sum is what B has to pay	11	13	1½

(8)

Firſt $81000000-59000000=22000000$ miles the diſtance the Earth is from Venus when in perigœo.
And $81000000+59000000=140000000$ miles, the diſtance the earth is from Venus, when in apogœo.
$\therefore 140000000-22000000=118000000$ miles the Anſ.

(9)

Firſt $46\times46=2116$
and $32\times12=\ \ 384$

Anſ. 1732 the no. req.

(10)

$$\begin{array}{rrr} £. & s. & d. \\ 18 & 6 & 4\tfrac{1}{2} \\ & & 12 \\ \hline \end{array}$$

£. 219 16 6 Anſ.

(11)

Firſt $35\times2 \quad =70$
and $5\times2+30=40$

Anſ. 30 diff.

(12)

Firſt $20+423+19=462$ the diviſor.
then $423\times462+20=195446$, the dividend

(13)

Firſt 109×73=7957 the greater number
and 28×17= 476 difference

7481 leſſer number

Then 7957+7481=15438 their ſum
Alſo 7957×7481=59526317 their product

(14)

Merchant's whole ſtock		£. 13000
Gain per annum	264×4=	1456
Ditto	586×3=	1758
Ditto	873×3=	[illegible]619
His whole gain		£. [illegible]833
His original ſtock to begin with		£. [illegible]167

(15)

To his widow	10000
To a charity	1693
To Nephews 2460×3	7380
To Nices 2100×4	8400
To 20 poor houſekeepers	210
To Executors	420
Anſ	£. 28103

(16)

Firſt 4429÷43=103; then 240—103=137 the Anſ.

(17)

Firſt 2262÷26=87, and 2262÷87=26;
then 87—26=61 the Anſ.

(18)

5190048÷72084=72 the Anſwer.

(19)

	s.	*d.*	
8)	12	8	worth of both
	1	7	do. of the purſe
Anſ. *s.*	11	1	caſh in do.

(20)

	£.	*s.*	*d.*
A and B had	13	10	0
B and C	12	12	0
A and C	11	16	6
ſum £.	37	18	6

which being divided by the number of players at each time will give the ſum won, viz.

$$\begin{array}{cccccc} \text{£.} & s. & d. & \text{£.} & s. & d. \\ 37 & 18 & 6 \div 2 = & 18 & 19 & 3 \end{array} \text{ what was won}$$

$$\text{Then from } \begin{array}{ccc} \text{£.} & s. & d. \\ 18 & 19 & 3 \end{array} \Big\} \text{take} \left\{ \begin{array}{ccc} 13 & 10 & 0 \\ 12 & 12 & 0 \\ 11 & 16 & 6 \end{array} \right\} \text{remains} \left\{ \begin{array}{cccl} 5 & 9 & 3 & \text{C's gain} \\ 6 & 7 & 3 & \text{A's do.} \\ 7 & 2 & 9 & \text{B's do.} \end{array} \right.$$

(21)

Firſt $\frac{1}{3}$ of $6=2$, and $\frac{1}{4}$ of $20=5$; then As $2 : 3 :: 5 : 7\frac{1}{2}$ Anſwer.

(22)

Firſt $\frac{3}{4}$ of $\frac{3}{5}=\frac{9}{20}$ ſold; then as $\frac{9}{20} : \frac{1710}{1} :: \frac{20}{20} : \frac{34200}{9}=3800$*l.* the Anſ.

(23)

Here A goes only $\frac{1}{12}$ of the circumference in an hour, and B goes the whole circumference in an hour; ſo B gains $\frac{11}{12}$ of A in that time, then

$$\begin{array}{cccccccc} & cir. & & h. & & cir. & & h.\ \ h.\ \ min. \\ \text{As} & \frac{11}{12} & : & 1 & :: & 1 & : & \frac{12}{11}=1\ \ 5\frac{5}{11} \end{array} \text{ the Anſ.}$$

(24)

Firſt 8—5= 3 miles B } gains of A in one day
and 10—5= 5 miles C }
m. *d.* *m.* *d.*
Then 3 : 1 :: 73 : $24\frac{1}{3}$ when A and B meet
alſo 5 : 1 :: 73 : $14\frac{3}{5}$ when A and C meet

And B and C can never meet with A but at the end of theſe periods.

∴ B and C can never both meet with A, but when ſome number of B's periods is equal to ſome number of C's periods. Therefore find two whole numbers which are in the ſame proportion, as $24\frac{1}{3}$ to $14\frac{3}{5}$, which will be 365 and 219, ∴ after 365 of B's periods, or 219 of A's; all three men will meet again, and not before; ∴ the time of meeting is $219\times24\frac{1}{3}=5329$ days Anſ.

(25)

h. *ciſ.* *h.* *ciſ.*
8 : 1 :: 22 : $2\frac{3}{4}$. then $2\frac{3}{4}-1=1\frac{3}{4}$
∴ as $1\frac{3}{4}$*c.* : 22*h.* :: 1*c.* : $12\frac{4}{7}$ hours Anſ.

(26)

Firſt 13°—1=12° moon gains of the ſun per day
and 30°×3=90° from 1ſt of Aries to 1ſt of Cancer
alſo 90°+3=93° ſun before the moon, then
deg. *days.* *deg.* *days.*
As 12 : 1 :: 93 : $7\frac{3}{4}$ moon overtakes the ſun
∴ $7\frac{3}{4}+3=10\frac{3}{4}$ degrees of Canſer the Anſ.

(27)

Firſt 3+5=8, then as 8 : 400 :: 3 : 150*l.* leſſer farm
8 : 400 :: 5 : 250*l.* greater farm

(28)

Firſt 3+5+8=16, then
As 16 : 2000 :: 3 : 375*l.* A's ſhare
16 : 2000 :: 5 : 625 B's ſhare
16 : 2000 :: 8 : 1000 C's ſhare
£. 2000 proof

(29)

$$\left.\begin{array}{ll}\text{A can do} & \frac{1}{3}=\frac{32}{96}\\ \text{B} & \frac{3}{8}=\frac{36}{96}\\ \text{C} & \frac{5}{12}=\frac{40}{96}\end{array}\right\}\begin{array}{l}\text{their ſum } \frac{108}{96}=\frac{9}{8} \text{ work, all working}\\ \text{together one week}\end{array}$$

1 week $=6$ working days, and 1 Day$=12$ working hours

$\therefore\ \frac{9}{8}$ work : 6 days :: 1 work : $\frac{48}{9}$ days$=5$ days 4 hours, the Anſ.

(30)

$$\left.\begin{array}{rl}\text{While A works} & 1=\frac{105}{105}\\ \text{B} & \frac{1}{3}=\frac{35}{105}\\ \text{C} & \frac{1}{5}=\frac{21}{105}\\ \text{D} & \frac{1}{7}=\frac{15}{105}\end{array}\right\}\begin{array}{l}\text{their ſum } \frac{176}{105}\text{, in an hour}\\ \text{together}\end{array}$$

wo. *h.* *wo.* *h.* *h.*

$\therefore\ \frac{176}{105} : 1 :: 3 : \frac{315}{176}=1\ 47'\ 23\frac{2}{11}''$ the Anſ.

(31)

Firſt $81000000\times81000000=6561000000000000$
then recip. as

$1 : 6561000000000000 :: 2 : 3280500000000000.$

$\therefore\sqrt{3280500000000000}=57275649$ miles the Anſ.

(32)

Firſt $13{\cdot}5-7{\cdot}5=6$ inches difference
Then, as $4 : 9 :: 6 : 13{\cdot}5$lb. the Anſ.

(38)

(33)

First 11×11=121, and the ſquare of 1 is 1, then as 1 : 16·083 :: 121 : 1946·083 feet Anſ.

$$1{\cdot}083 \times \left\{\begin{array}{l} 1=\ 16{\cdot}083 \\ 3=\ 48{\cdot}25 \\ 5=\ 80{\cdot}416 \\ 7=112{\cdot}583 \\ 9=144{\cdot}75 \\ 11=176{\cdot}916 \\ 13=219{\cdot}083 \\ 15=241{\cdot}25 \\ 17=273{\cdot}416 \\ 19=305{\cdot}583 \\ 21=337{\cdot}75 \end{array}\right\} \text{in the} \left\{\begin{array}{c} 1\text{ſt.} \\ 2\text{d.} \\ 3\text{d.} \\ 4\text{th} \\ 5\text{th} \\ 6\text{th} \\ 7\text{th} \\ 8\text{th} \\ 9\text{th} \\ 10\text{th} \\ 11\text{th} \end{array}\right\} \text{ſec. of time}$$

Anſ. 1946·083 as before

(34)

Thus, as, 16·083 : 1^2 :: 400 : 24·877 ∴ $\sqrt{24{\cdot}877}=4{\cdot}987+$, or 5 ſeconds nearly Anſ.

(35)

$$\begin{array}{lccccc} & \textit{ſtud.} & & \textit{days} & & \textit{ſtud.} \\ \text{thus ſtated} & 4 & : & 40 & :: & 12 \\ & 14h & : & & :: & 10h \\ \hline & 56 & & & & 120 \\ & 40 & & & & \\ \hline 12|0) & 224|0 & & & & \end{array}$$

Anſ. $18\frac{2}{3}$ days

(36)

m. gal. m. gal.

Firſt, as 9 : 14 :: 31 : $48\frac{2}{9}$ fills in 31 minutes.

Then $48\frac{2}{9}-40=8\frac{2}{9}$ gallons in the tub at the end of 31 min. and from 2 to 5=3 hours, or 180 minutes.

m. gal. m gal.

Again, as 31 : $8\frac{2}{9}$ :: 180 : $47\frac{23}{31}$ fills in 3 hours, and $147-47\frac{23}{31}=99\frac{8}{31}$ gallons wants of being full.

gal. m. gal. m. ſec.

Alſo, as 14 : 9 :: $99\frac{8}{31}$: 63 $48\frac{228}{434}$ the tub will be full, which added to 5 o'clock will give 3 min. $48\frac{228}{434}$ ſec. after 6 the tub will be full.

(37)

Diſcharges are here made in proportion to the ſquare root of the height of the column of water, and the ſquare of the diameter of the diſcharging pipe from that column.

Thereſore the ſquare root of 25=5; ſquare root of 1=1; ſquare root of 16=4; and ſquare of 2=4.

```
     f.      h.      f.
◆  5 ——— 1000 ——— 4
◆  1 in ————————— 4 inches
◆ 40 hour ——— 24 hours
                 1000
                    4
                 ————
                 4000
                    4
                 ————
         5      16000
         1         24
        ——      —————
         5      64000
        40     32000
       ———    ———— —
      2|00)3840|00
               ————
      Anſ. 1920 Hhd.
```

(38)

£. £. £. £.
As 150 : 560 :: 40 : 149⅓ A's ſtock
150 : 560 :: 50 : 186⅔ B's ſtock
150 : 560 :: 60 : 224 C's ſtock

£. 560 proof

(39)

£.
Firſt A's ſtock 168
time 5 months

18 : 840 :: 12
12

18 { 2)10080
9) 5040

B's time 8) 560

£. 70 B's ſtock

Secondly As 18 : 840 :: 60
60

18 { 3)50400
6) 16800

C's money £.4|00) 28|00

C's time 7 months

(40)

£. £. £. £.
As 100 : 20 :: 400 : 80 for A

£. *mo.* *mo.*
Then, as 80 : 12 :: 50 : $7\frac{1}{2}$ A's time
B's time A's ſtock A's time B's ſtock
and as 5 : 400 :: $7\frac{1}{2}$: 600
} Anſ.

(41)

100÷ 5=20
300÷ 8=37·5
600÷12=50
1000÷15=66·666

ſum 174·166)300·000(1·72248 com. multiplier
1·72248×20 =34·45 acres A's ſhare
1·72248×37·5=64·593 acres B's ſhare
1·72248×50 =86·124 acres C's ſhare
1·72248×66·666=114832 acres D's ſhare

proof 300·000 acres

(42)

Firſt $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ reduced to a common denominator, will be $\frac{20}{60}$, $\frac{15}{60}$ and $\frac{12}{60}$:
And 20+15+12=47 by rejecting the denominators

Then as 47 : 100000 :: {
20 : $42553\frac{9}{47}$ A's part
15 : $31914\frac{42}{47}$ B's part
12 : $25531\frac{43}{47}$ C's part

But $25531\frac{43}{47}$*l*. C's part being loſt by his death, it muſt be divided between the other two in proportion as 4 to 3; viz. 4+3=7 : $25531\frac{43}{47}$ :: 4 : $14589\frac{219}{329}$.
7 : $25531\frac{43}{47}$ :: 3 : $10942\frac{82}{329}$.
∴ $42553\frac{9}{47}$+$14589\frac{219}{329}$=$57142\frac{282}{329}$ A's part
And $31914\frac{42}{47}$+$10942\frac{82}{329}$=$42857\frac{47}{329}$ B's part

£. 100000 proof

(43)

Take a number at pleaſure and divide it in proportion to their ſhares, then proceed by the ſingle Rule of falſe.

A 120
B 80
C 75
D 72

347 : 2000 :: $\left\{\begin{array}{l} 120 : 691\frac{223}{347} \text{ A's ſhare} \\ 80 : 461\frac{33}{347} \text{ B's do.} \\ 75 : 432\frac{96}{347} \text{ C's do.} \\ 72 : 414\frac{342}{347} \text{ D's do.} \end{array}\right.$

£. 2000 proof

(44)

18 months
5=9−4mo.
90
10 acres
3)900
$3\frac{1}{3}$ acres
2700
300
di. 3000

21 oxen
9 mo.
189
14=18−4 mo.
2646
24 acres
10584
5292
3)63504
$3\frac{1}{3}$ acres
190512
21168
211680
−103680
3|000)108|000
Anſ. 36 oxen

12 oxen
4 months
48
9 months
432
24 acres
1728
864
10368
10 acres
103680

(45)

(45)

Firſt ſuppoſe 10 = the number of the whole company at firſt.

Then $10 \times 13s. = 130s.$ the whole reckoning.
Taking 3 away, 7 remains at $19\frac{1}{2}s. =$ $136\frac{1}{2}s.$
Should be equal to the whole reckoning $= 130$

1ſt error too much, $+ \ 6\frac{1}{2}$

Second, ſuppoſe 20 = the number at firſt
Then $20 \times 13s. = 260s.$ the whole reckoning
Taking out 3 remains 17, at $19\frac{1}{2}s.$ a-piece $=$ $331\frac{1}{2}s.$
Should be equal the whole reckoning $=$ 260

2d error too much, $+ \ 71\frac{1}{2}$

$6\frac{1}{2} \times 20 = 130$ take
$71\frac{1}{2} \times 10 = 715$ from

65 $\quad 65)585(9$ at firſt Anſ.
585

Hence, 9 at 13s. each = 117 the recokning } proof
6 at $19\frac{1}{2}s.$ each = 117 the ſame }

(46)

From the nature of the queſtion, it appears that the increaſe in the 1ſt year will be 0, in the ſecond year 1, in the 3d year 1, in the 4th year 2, in the 5th year 3, in the 6th year 5, and ſo on to 40 years or terms (each term being = to the ſum of the two next preceding ones) whence, the two laſt terms are 39088169 and 63245986, and the ſum of them all (or the whole ſeries) $= 2 \times 63245986 + 39088169 - 1 =$) 165580140, the increaſe required.

(47)

By the nature of the queſtion, it appears that the increaſe in the 3d year will be 1, in the 4th year 1, in the 5th year 1, in the 6th year 2, in the 7th year 3, and ſo on to 20 years, or terms (each term being = to the ſum of the laſt term and the next but one preceding) whence the three laſt terms are 189, 277 and 406, and the ſum of them all (or the whole ſeries) $=2\times406+277+189=1278$ whole ſtock.

FINIS.